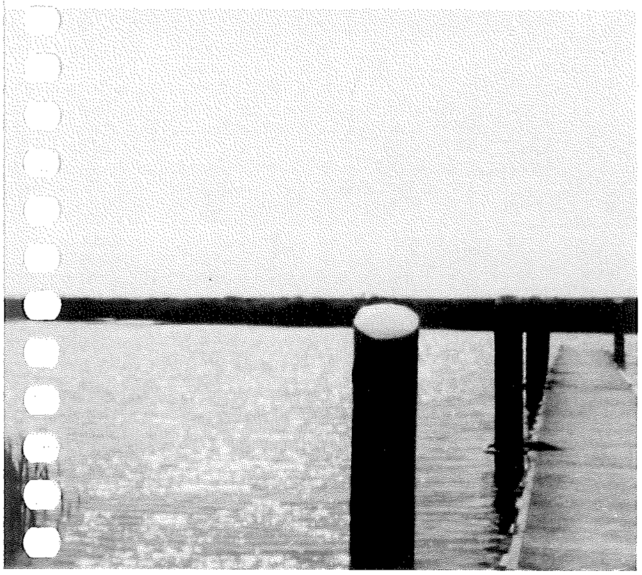

FINAL ENVIRONMENTAL IMPACT REPORT
VOLUME II: APPENDICES

State Clearinghouse No. 2007082071

Alviso Slough Restoration Project

November 2009

Santa Clara Valley Water District

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Water District

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Draft Environmental Impact Report

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Appendix A

Notice of Preparation and Scoping Comments

NOTICE OF PREPARATION

August 7, 2007

From: Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Subject: **Notice of Preparation of a Draft Environmental Impact Report**

Project Title: Alviso Slough Restoration Project
The Santa Clara Valley Water District is undertaking the Alviso Slough Restoration Project: to restore Alviso Slough's channel width and habitat to prior to 1983 conditions; to improve the community's ability to pursue navigation, access, and aesthetics; to encourage the expansion of boating and other recreational and/or tourism opportunities; to maintain one-percent flood protection in Alviso Slough; to reduce mosquito nuisance and to promote the integration with the Salt Pond Restoration Program to bring salt water connections to the Lower Guadalupe River.

Project Location: Alviso (City of San Jose, Santa Clara County, CA)
The Santa Clara Valley Water District will be the Lead Agency and will prepare an Environmental Impact Report (EIR) for the above project. The District requests the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency may use the EIR prepared by our agency when considering your permit or other approval for the project.

The project description, location, and the potential environmental effects are contained in the attached materials.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date but **not later than September 14, 2007**.

Please send your response Via U.S. Mail or E-mail:

Michael F. Coleman, AICP
Project Manager /Environmental Planner
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Phone: 408) 265-2607 Ext. 3096; Email:mcoleman@valleywater.org

We request the name and address for a contact person in your agency, or your name if you are an individual or representing a group.

A public Scoping Meeting for the Draft EIR will be held on **August 30, 2007**, from **6:00 p.m. to 8:00 p.m.** at the **George Mayne Elementary School**, 5030 North First Street Alviso, CA 95002.

Stan Williams

Stanley Williams
Chief Executive Officer

8/1/07
Date

Notice of Preparation of a Draft Environmental Impact Report For the Alviso Slough Restoration Project

Santa Clara County, California

August 7, 2007

1.0 INTRODUCTION

The Santa Clara Valley Water District is undertaking the Alviso Slough Restoration Project: to restore Alviso Slough's channel width and habitat to prior to 1983 conditions; to improve the community's ability to pursue navigation, access, and aesthetics; to encourage the expansion of boating and other recreational and/or tourism opportunities; to maintain one-percent flood protection; to reduce mosquito nuisance; and to promote the integration with the Salt Pond Restoration Program to bring salt water connections to the Lower Guadalupe River.

The Santa Clara Valley Water District (District) will prepare a Draft Environmental Impact Report (EIR) for the Alviso Slough Restoration Project. This Notice of Preparation (NOP), required by the California Environmental Quality Act (CEQA) and CEQA Guidelines (14 CCR 15082), contains a description of the project and alternatives to date, location, project goals and objectives, possible environmental impacts, and the need for an EIR. The District is the Lead Agency for compliance with CEQA.

Summary:

30-day Public Scoping Period:	August 14, 2007 *to* September 14, 2007
CEQA (EIR) Public Scoping Meeting:	**August 30, 2007, 6-8 pm** George Mayne Elementary School, Alviso
Contact:	Michael Coleman Project Manager / Environmental Planner Santa Clara Valley Water District 5750 Almaden Expressway San Jose, CA 95118 (408) 265-2607 ext. 3117 Mcoleman@valleywater.org

2.0 PROJECT LOCATION

Alviso Slough is located along the edge of the San Francisco Bay, seven miles northwest of downtown San Jose, in the natural floodplains of two major freshwater watercourses, the Coyote Creek and the Guadalupe River (Figure 1). Alviso Slough now functions as the tidal slough channel portion of the Lower Guadalupe River that connects the river to Coyote Creek and South San Francisco Bay. It is the last reach of the Guadalupe River before it enters open waters of San Francisco Bay. The river flows north from the Santa Cruz Mountains through downtown San Jose. In the 1940's both sides of Alviso Slough were leveed to create the adjacent salt ponds.

The Project Area is adjacent to the Town of Alviso. Alviso was incorporated in 1852 and consolidated with the City of San Jose in 1968. The Alviso Marina County Park, the Don Edwards San Francisco Bay National Wildlife Refuge, and salt ponds occupy most of the area around Alviso.

3.0 RELATED PROJECTS

There are two main projects underway in the vicinity of Alviso Slough: the South Bay Salt Ponds Restoration Project and the Alviso Marina County Park Improvement Project. The District does not have approval authority over these projects, but project managers for the District and for the other agencies are working to integrate the planning processes and share information wherever possible.

South Bay Salt Ponds Restoration Project

Concurrent with this effort for Alviso Slough, the first phase of the South Bay Salt Pond (SBSP) Restoration Project, led by a consortium of agencies, (i.e., California Coastal Conservancy, U.S. Fish & Wildlife Service, CA Dept. of Fish & Game), is currently underway with work ongoing for preparing the Environmental Impact Statement/Environmental Impact Report (EIS/EIR) on the proposed SBSP Programmatic Project and Phase 1 Action. Pond A8, located immediately adjacent to the Alviso Slough Restoration Project site, has been proposed as one of several locations for early implementation of the SBSP Restoration Project.

While not yet approved, the SBSP Phase 1 Action at Pond A8 aims to restore tidal exchange to create approximately 1,400 acres of shallow subtidal habitat in Ponds A8, A5 and A7. This project could result in the restoration of a more natural process of tidal scour in Alviso Slough. This project may partially deter re-establishment of marsh vegetation that may be removed as part of either the SBSP Phase 1 Action or the Alviso Slough Restoration Project. The Phase 1 Action includes a constructed 'notch' that can be opened from 0 to 40 feet in width (20-foot increments), that will control water flow between Pond A8 and Alviso Slough.

The location of the notch has important implications for vegetation that may be removed as part of the Alviso Restoration Project. The SBSP's preliminary design has placed the notch immediately upstream (landward) of the boat docks near the South Bay Yacht Club (SBYC), which would maximize scour in this area (as shown in Figure 2). In the event that monitoring results indicate that the ecological risk associated with mercury toxicity in wildlife is unacceptable, the notch may be closed and, thus, vegetation and sediment removal as a result of Pond A8-induced scour would not be sustained.

The SBSP Draft EIS/EIR was released for public review and comment in March 2007. Information about the SBSP project can be found on the Web: http://www.southbayrestoration.org.

Santa Clara County - Alviso Marina County Park Improvement Project

This project is located on Alviso Slough on a 1.8 acre parcel that the County acquired from the federal government, adjacent to the existing Alviso Marina parking area. The key features include construction of a new 2-lane boat-launching concrete ramp with boarding docks, including docking facilities to accommodate small non-motorized water crafts such as kayak and canoes, and construction of a 22-vehicle/trailer parking lot. Design of this facility is currently underway.

The Alviso Marina County Park Improvement Project provides synergy to the Alviso Slough Restoration Project to improve access for boating and navigation in the South Bay.

4.0 BACKGROUND AND PROJECT OBJECTIVES

The reach of Alviso Slough downstream of the Gold Street Bridge has experienced a gradual decline in channel width and increasing encroachment from vegetation over many years. These conditions have come about in the past century of human activities because of groundwater over-pumping, the manipulation of the South Bay marshlands and drainage channels for agricultural and salt-making purposes, the realignment of channel meanders for more efficient flow conveyance, and urban development in the watershed. These human-related influences, combined with natural processes have resulted in a reduced channel width and depth that precludes the community's use of the slough for navigation and recreational access.

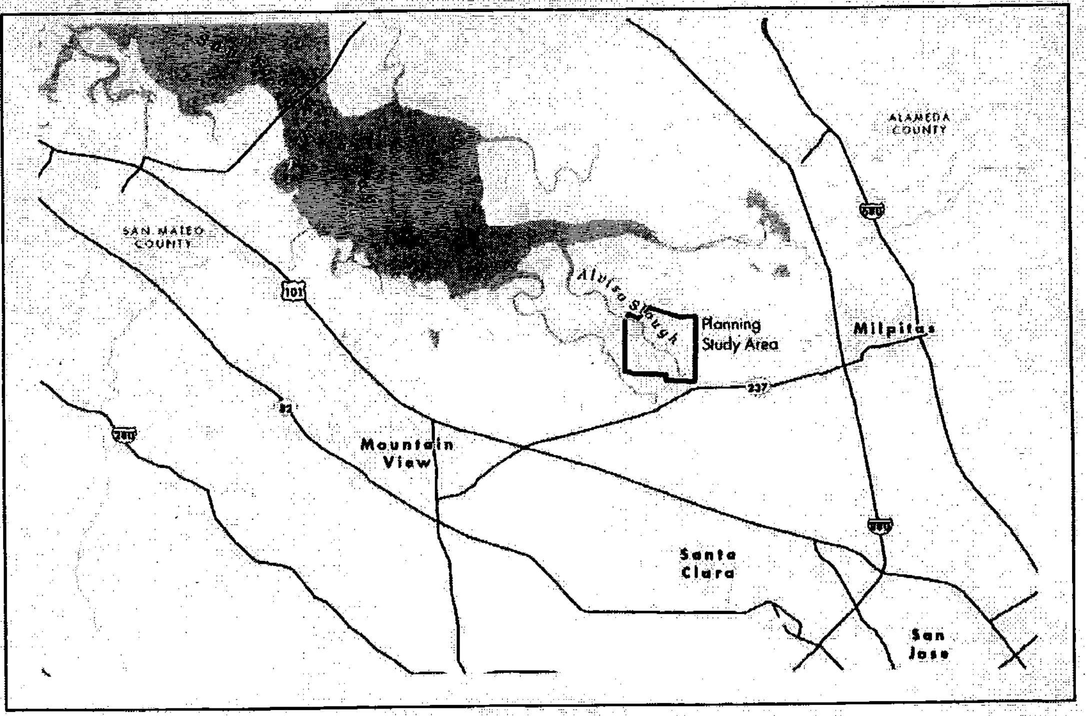


Figure 1. Project Location

The purpose of this project is to restore the slough to its previous condition to create more open waters, enhance natural aesthetics, improve recreation access and return to the historic uses of the slough.

The proposed Draft Environmental Impact Report will evaluate a range of alternatives to accomplish the following project objectives as listed in the Refined Project Objectives:

- Restore Alviso Slough's channel width and habitat to prior-to-1983 conditions
- Improve the community's ability to pursue navigation, public access, and aesthetics to allow for the expansion of boating and other recreational and/or tourism opportunities
- Maintain one-percent flood protection in Alviso Slough
- Reduce mosquito nuisance
- Promote the integration with the Salt Pond Restoration Program (including the Pond A8 Applied Study) to bring salt water connections to the Lower Guadalupe River

5.0 PROJECT DESCRIPTION AND ALTERNATIVES

Per CEQA Guidelines Section 15126.6 (a), the discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives or would be more costly. The District has identified a range of feasible alternatives for public review and comment which are identified as follows:

Alternative No. 1: Vegetation and Root Mass Removal (2.6 acres), to 4-foot depth

Alternative No. 2: Vegetation/Root Mass Removal (7.0 acres), to 4-foot depth

Alternative No. 3: Vegetation/Root Mass Removal and Shallow Dredging (3.7 acres) to 8-foot depth

Alternative No. 4: Vegetation/Root Mass Removal and Deep Dredging (6.2 acres) to 16-foot depth

Alternative No. 5: Vegetation/Root Mass Removal (15.3 acres) to 4-foot depth and Dredging (9.7 acres) to 10 foot depth

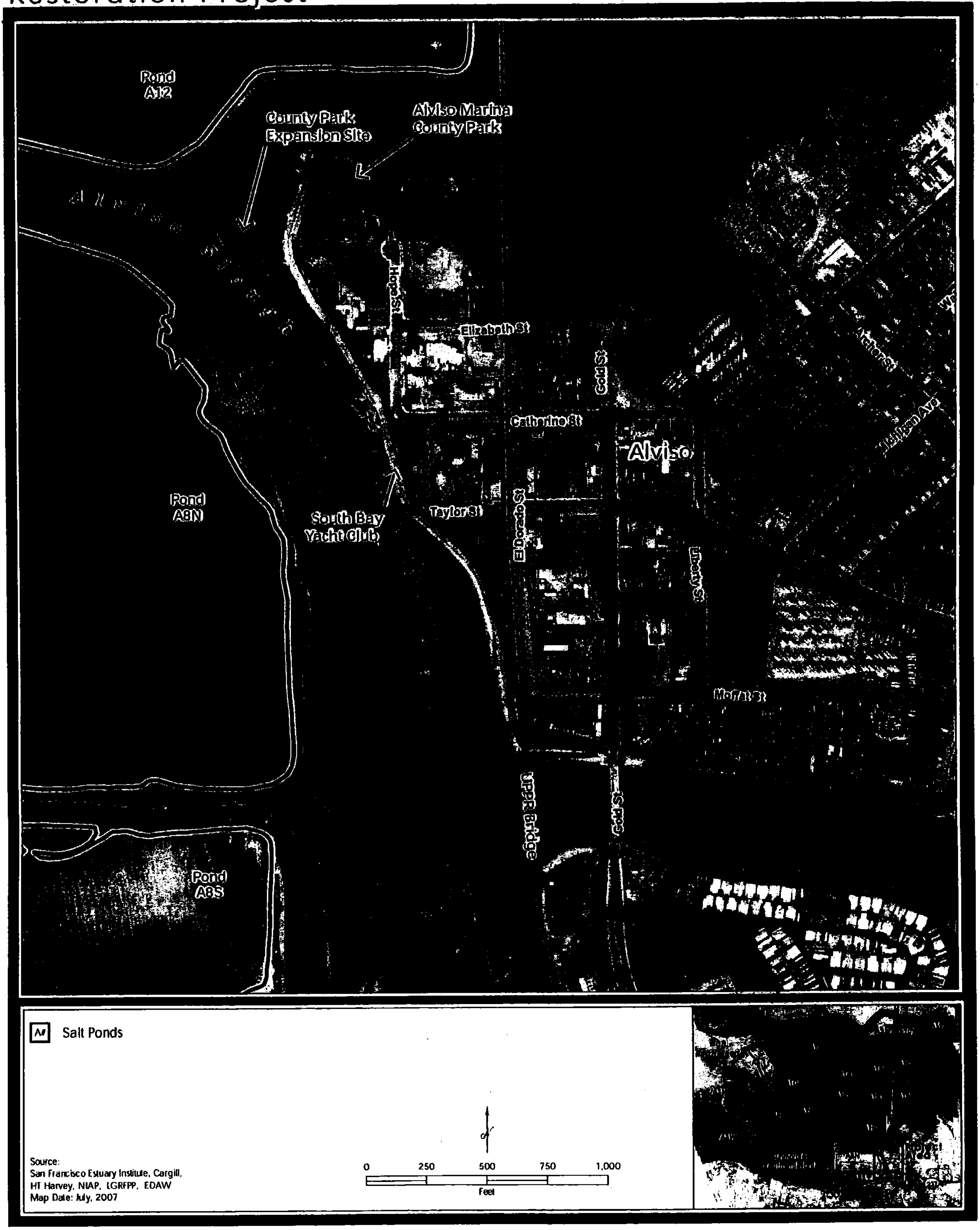
Alternative No. 6: No Project (required by CEQA)

These alternatives may be modified, and/or additional alternatives may be identified, through the public scoping process.

Figure 2, as shown on the following page, illustrates the Project Area of the five proposed action alternatives.

Alviso Slough Restoration Project

Figure 2: Project Area



Source:
San Francisco Estuary Institute, Cargill, HT Harvey, NIAP, LGRFPP, EDAW
Map Date: July, 2007

Alternatives No. 1 and No. 2: Vegetation and Root Mass Removal

Alternatives No. 1 (2.6 acres) and 2 (6.2 acres) aim to restore the Slough's open water channel width to prior to 1983 conditions while meeting the duty for public agencies under CEQA Guidelines Section 15021 to avoid or minimize environmental damage where feasible by developing alternatives that reflect a smaller footprint or impact area and less depth, as compared to the other alternatives, while still meeting objectives of historic use of the slough within the project area (navigation, recreation, public access). For these project alternatives, aquatic vegetation removal would include removing the plant and roots to a maximum depth of 4 feet. No sediment is proposed to be removed under these alternatives (1 and 2); thus there will be little increase in slough depth. There are three basic vegetation removal methods for aquatic environments: mechanical removal (mowing and discing); hand removal (chain saws, weed-eaters, etc.); and chemical removal (herbicide application), as illustrated below.

Potential Vegetation Removal Methods

Method	Effectiveness	Change in bottom depth of slough	Maintenance Frequency
Mechanical/Rotovator with Aquatic Weed Harvester (e.g., Aquamog)	High- removes entire root mass	minimal	Every 3 Years
Hand Removal	Low; does not remove root mass	none	Annual/ongoing
Chemical Treatment	Medium; does not remove root mass	none	Annual for 5 years, none thereafter

The method or combination of methods chosen for a particular site depends on the goals of the project, initial cost, maintenance cost, environmental impacts and public health/safety protection. Based on local conditions, it is assumed that a mechanical method, such as an *Aquamog*, would be the primary means for vegetation removal for this project; hand removal and/or chemical treatment may be proposed as a supplement to the mechanical method.

A land-based staging area for the harvested plant material would be needed for de-watering purposes, allowing the removed plant material to become more compact and thereby maximizing off-site waste disposal efficiency. De-watering of the aquatic vegetation is relatively quick, requiring approximately 2 to 3 days. A loader/dozer would transfer the vegetation from the aquatic weed harvester to the staging area (the staging area is yet to be determined, but would likely be nearby). The vegetation would then be hauled to the nearby waste facility on Zanker Road, where only dry, or nearly dry, green material is accepted.

Alternatives No. 3 and No. 4: Vegetation and Root Mass Removal and Dredging

Alternatives No. 3 (3.7 acres) and 4 (7 acres) aim to restore the Slough's open water channel width to prior to 1983 conditions while meeting the duty for public agencies (CEQA Guidelines Section 15021) to avoid or minimize environmental damage where feasible by developing alternatives that reflect a medium level footprint or impact area and depth (8 foot maximum under Alternative 3 and 16-foot maximum depth under Alternative 4), as compared to other alternatives, which will limit the frequency of future dredging while still meeting the objectives of historic use of the slough within the project area (navigation, recreation, public access).

These dredging alternatives would involve the excavation of vegetation, root mass, and sediment in the channel. Based on observed sedimentation rates of 1-2 feet per year in the now abandoned Alviso Marina County Park, (Ruth and Going, 1980) a dredge to 8 feet could provide navigational benefits for up to 3 years. A deep dredge to approximately 16 feet below existing grade could delay marsh re-establishment by up to a decade or more. This 16-foot depth approximates the equilibrium channel depth expected after implementation of the full tidal action proposed for the larger SBSP Restoration Project (10 years or more). The 8-foot dredge could be accomplished by the same equipment that can perform the vegetation removal (the Aquamog, used in Alternatives No. 1 and 2). The 16-foot dredge would require larger and heavier equipment to reach the required depth.

Alternative No. 5: Vegetation and Root Mass Removal (two separate areas) and Dredging

Alternative No. 5 aims to restore the Slough's open water channel width to prior to 1983 conditions, which would allow Alviso to return to historic use of the slough within the project area (navigation, recreation, public access). This would be accomplished by a combination of (1) vegetation and root-mass removal with dredging up to 8 feet in depth within the channel (9.7 acres), and (2) removal of vegetation and root mass on both sides of the channel to accomplish conditions reflective of 1983 environmental conditions (15.3 acres). These techniques are described in more detail below. This alternative represents the largest extent of vegetation removal and dredging of the alternatives identified for consideration thus far.

Dredged sediment would have to be dewatered before disposal at the Zanker Road waste facility; this would require a staging area where dredged sediment and vegetation could dry for several days prior to being hauled to the disposal facility. Sediment quality dictates disposal options. Based on mercury levels in core samples collected in Alviso Slough to date, dredged sediments likely will not meet beneficial re-use requirements and would be disposed of at a local disposal facility.

Flood Management Options and Vessel Removal Requirements Common to Alternatives 1-5

The existing weir at Pond A8, which is designed to allow overflows from Guadalupe River to the Pond A8 complex during high flow events, would have to be lowered from one to four feet (depending on which alternative is implemented) to maintain one percent flood protection along Alviso Slough. An alternative option to lowering the weir at Pond A8 would be to build up the Don Edwards San Francisco Bay National Wildlife Refuge outboard levee along Pond A12. This alternative option is included for EIR purposes; however this levee is under refuge ownership and control, and structural modifications funded or performed by another agency may or may not be a realistic solution. Alternatives 1 through 5 would include removal of abandoned vessels and navigational hazards within the Project Area.

Alternative No. 6: No Project

The No Project alternative is required by CEQA. Under the No Project alternative, the District would take no action to restore navigation and recreation in the slough or to meet other project objectives. Channel maintenance or other activities (such as regular maintenance of the flood protection levees, etc.) would continue under current maintenance programs. The No Project alternative would not require any flood management actions (such as modifying the weir at Pond A8). Removal of abandoned vessels and navigational hazards would not occur as part of this project under the No Project alternative.

6.0 Alternatives Not Considered For Further Evaluation

The EIR should identify any alternatives that were considered by the Lead Agency but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the Lead Agency's determination. Alternatives that may be rejected for further evaluation following the scoping may include the following early options discussed at community meetings:

- Land Based Enhancements only (e.g. New Community Facilities).
- Development of Ferry Terminal by State of California Bay Area Water Transit Authority
- Environmental Enhancements Only (remove hazardous sediments if present and any other public hazards)
- Community Based Financing (Assessment Districts, or similar, to set a strong financial basis for community development).

7.0 POSSIBLE ENVIRONMENTAL EFFECTS

Because of the potential for significant impacts on the environment, the District has decided to prepare an EIR under CEQA. The Draft EIR will analyze the topic areas identified below in detail, and any others for which potentially significant impacts are identified. The Draft EIR and Mitigation Monitoring and Reporting Program (MMRP) will propose measures to mitigate any impacts evaluated as significant.

Air Quality

- Construction-related emissions could result from equipment use at the project site and truck trips to and from the Zanker Road disposal facility.

Aquatic Biology

- Increased turbidity during the construction and maintenance activities could degrade water quality and adversely affect aquatic habitat, the food web, and fish populations.
- Vegetation removal and/or dredging could result in the loss of wetlands/marsh aquatic habitat or conversion of wetland/marsh aquatic habitat to mudflats or open water habitat. These activities could result in potential benefits to those aquatic species that primarily utilize open water and inundated mudflat habitats, and adverse effects to those aquatic species that primarily utilize marsh habitats.
- Lowering the existing weir along Pond A8 (required as part of this project) to maintain one-percent flood protection along Alviso Slough could result in adverse impacts to fish species.
- Project activities could impact special-status and/or endangered species and habitat. (Central California Steelhead, Green Sturgeon, Longfin smelt, Chinook salmon, and Clapper rail)

Terrestrial Biology

- Construction activities could result in a loss of, or disturbance to special-status, marsh-associated wildlife, nesting pond-associated birds, and/or special-status plants.
- Colonization by non-native vegetative species could result from project activities.
- Project activities could impact special-status and/or endangered species and habitat (Salt Marsh Harvest mouse).

Cultural Resources

- Construction activities could result in a loss of or disturbance to cultural and historic resources. Potential impacts to cultural resources will be assessed, including historic and archaeological resources, in order to determine whether the project or alternatives may have a substantial adverse effect on the significance of the resource.

Hydrology and Geomorphology

- Construction activities could result in potential impacts to hydrology, channel hydraulics, and geomorphology. The EIR will make assessments to determine whether the project or alternatives may have a substantial adverse effect on the environment.

Recreation

- Project implementation could result in potential impacts to recreation. The EIR will include a full technical study that evaluates impacts, as well as opportunities and constraints.

Water and Sediment Quality

- Short-term impacts of turbidity and sediment disturbance to water quality could occur from dredging and vegetation removal activities.
- Potential construction-related effects on water quality include disturbance of mercury and other contaminants present in the sediment.

Environmental Justice

- The State of California now defines environmental justice as "the fair treatment of people of all races, cultures and incomes with respect to the development, adoption, implementation and enforcement of environmental laws, regulations and polices." This is accomplished through CEQA by examining cumulative impacts, the interaction of physical and social impacts and the need for alternatives that avoid significant impacts. Social and Economic impacts will also be assessed as part of the EIR.

Global Climate Change

- Currently the decision by the Lead Agency to address Global Climate Change (GCC) is optional.[1] In the absence of regulatory guidance, and prior to the resolution of CEQA challenges regarding GCC impact analysis, CEQA documents may choose to address Global Greenhouse Gas emissions on a case-by-case basis using methods tailored to the project's circumstances. If a Lead Agency chooses to address GCC in the EIR, it should be addressed in the context of a cumulative (versus project-specific) impact. Currently there are no published thresholds of significance for measuring the impact of GCC on, or from, a project. However, the precise timing, nature and magnitude of climate change impacts at specific locations is not certain, although projections with wide confidence limits have been developed for some parameters, such as sea level rise and meteorology.

Other Environmental Issues

- Other topics that will be addressed in detail in the EIR include: aesthetics; geology and soils; hazardous materials; land use and planning; noise; population and housing; public health and vector management; public services; traffic; and utilities.

Possible impacts related to both the construction phase, as well as ongoing maintenance activities, will be identified and analyzed. Wherever impacts would be significant, the EIR will identify and discuss feasible mitigation measures.

Because of some uncertainty as to the timing and success of the South Bay Salt Pond Phase 1 Action (see Section 3), the impact analysis of the Alviso Slough Restoration Project will be performed for two scenarios: one based on a completed/ successful SBSP Phase 1 Action at Pond A8; and the second assuming that the Phase 1 Action is not implemented or is halted.

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[1] Alternative Approaches to Analyzing Greenhouse Gas Emissions and Global Climate Change in CEQA Documents, June 29, 2007

8.0 ENVIRONMENTAL REVIEW AND APPROVALS

California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA)

As the Lead Agency responsible for compliance with CEQA, the District has determined that the project may have a significant impact on the physical environment, and has decided to prepare an EIR to provide ample opportunity for public disclosure and public participation in the planning and decision-making process.

The United States Army Corps of Engineers (USACE) is expected to be the federal Lead Agency, and, as such, is expected to prepare an Environmental Assessment (EA) for compliance with the National Environmental Policy Act (NEPA). Alternatively, at their discretion, the USACE may prepare an Environmental Impact Statement (EIS), which would require more rigorous analysis and review of impacts than would an EA. The USACE has sole discretion to prepare and approve their EA or EIS.

Information obtained to date from USACE indicates that they would prefer to complete their own National Environmental Policy Act (NEPA) environmental documentation rather than have the District prepare a "Joint Document" (CEQA/NEPA). The USACE would review the proposed project more closely to determine NEPA documentation needed once the District files a permit application with them.

CEQA and NEPA require evaluation of a reasonable range of proposed project alternatives to be evaluated in an environmental document subject to public review, in addition to a mandatory No Project scenario. CEQA specifies that the reasonable range include those alternatives that (1) meet all or most of the project objectives, (2) are ostensibly feasible, and (3) would avoid or lessen significant environmental effects of the project. The range of alternatives will foster informed decision-making and public participation.

Both CEQA and NEPA stress the importance of meaningful public participation in the identification of possible alternatives and impacts. Consequently, the District will conduct a public scoping meeting on August 30, 2007 to solicit input from all interested parties such as Alviso and Bay Area residents, environmental or recreational organizations, and regulatory agencies. The USACE may or may not hold a public meeting at a later date to solicit input on their NEPA process.

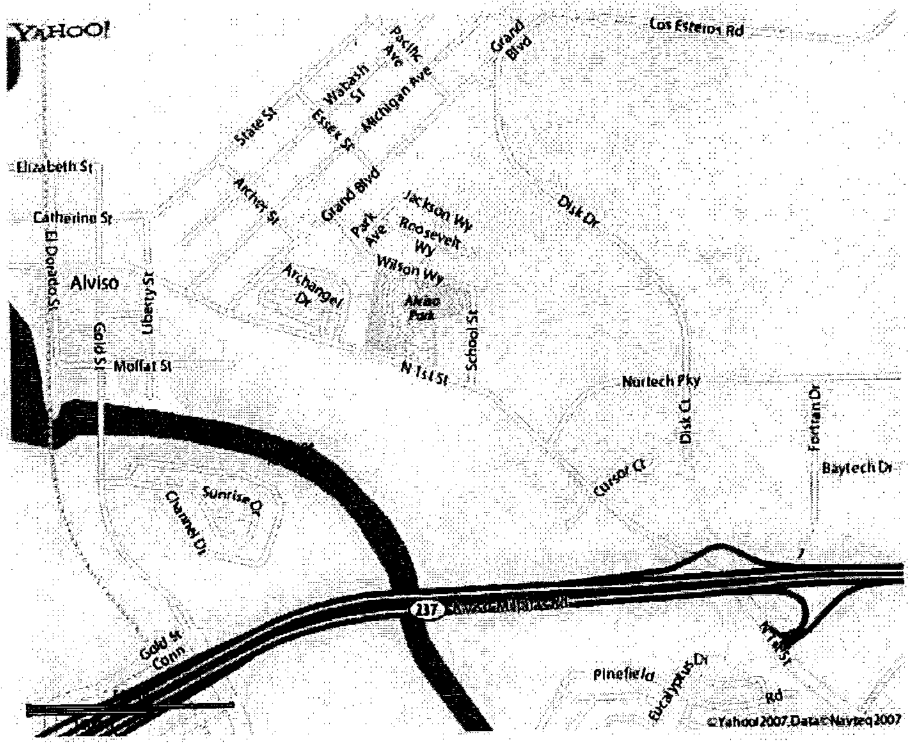
EIR Scoping and Public Review Process

The first step in the environmental review process for the EIR is the formal public scoping process. This NOP initiates the CEQA scoping process through which the District will refine the scope of issues and alternatives to be addressed in the Draft EIR. The 30-day NOP public scoping period will begin on August 14, 2007 and end on September 14, 2007. A CEQA public scoping meeting will be held **on August 30, 2007** in Alviso.

The purpose of this meeting is to obtain public input on the proposed scope and content of the EIR summarized in this NOP. The public will have the opportunity to comment and offer testimony for consideration. The District will also accept written comments at the meetings or by U.S. mail or e-mail until the close of business on September 14, 2007.

Following the public scoping meeting, a Draft EIR will be prepared and circulated for a minimum 45-day public review period. Public comments on the Draft EIR will be accepted in writing or orally at a formal public hearing to be held by the District. These comments, along with the Draft EIR and any revisions to the Draft included in the District's Responses to Comments, will be submitted to the District Board for certification as a Final EIR.

All persons and organizations who wish to be notified when the Draft EIR is available for review should respond to this notice and provide a current address. District Contact information is provided at the end of this notice.



The District will hold a CEQA (EIR) Public Scoping Meeting:

- August 30, 2007
- 6-8 pm
- George Mayne Elementary School
  5030 North 1st St. (at School Road)
  Alviso, CA

Approvals

In addition to certification of the Final EIR by the District's Board of Directors, a number of discretionary approvals from regulatory agencies would be required prior to construction. To a large degree, the project definition, purpose, need, and the extent of proposed activities determine the specific type of approval requested from appropriate resource agencies. The range of discretionary approvals that are anticipated to implement the proposed project activities depend, for example, on whether an alternative is identified that removes vegetation with little sediment removal, or an alternative that dredges the slough is identified. Essential to all of these permitting considerations is a clear purpose and need for the project. The list of potential permits and consultations required for this project are: .

Local Agency:

- Santa Clara Valley Water District: CEQA Lead Agency responsible for distribution of Draft EIR and certification of Final EIR

State Agencies

- Regional Water Quality Control Board (RWQCB): Section 401 Water Quality Certification and/or Waste Discharge Requirement (WDR)
- Bay Conservation and Development Commission (BCDC): Administrative or Major Permit
- California Dept. of Fish and Game (CDFG): Consultation for special status species
- State Historic Preservation Office (SHPO)
- California State Lands Commission (CSLC): Consultation for CEQA and leased lands
- Caltrans and VTA[2]

Federal Agencies

- U.S. Army Corps of Engineers (USACE): NEPA documentation (EA or EIS); Section 404 Individual Permit, with 404(b)(1) Alternatives Analysis
- US Fish and Wildlife Service (USFWS): Letter of Concurrence for No Effect
- NOAA Fisheries: Letter of Concurrence for No Effect
- National Historic Preservation Act Section 106 Review

9.0 Contact Information

For further information, please contact the following:

Michael Coleman
Project Manager /Environmental Planner
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118
(408) 265-2607 ext. 3096
MColeman@valleywater.org

Also see the District's Web page:
http://www.valleywater.org/Water/Watersheds - streams and floods/Watershed info & projects/Guadalupe/index.shtm

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[2] CEQA Guidelines Section 15086:For a project of statewide, regional, or area wide significance, the transportation planning agencies and public agencies which have transportation facilities within their jurisdictions which could be affected by the project. "Transportation facilities" includes: major local arterials and public transit within five miles of the project site, and freeways, highways and rail transit service within 10 miles of the project site.

Alviso Slough Restoration Project
CEQA Public Scoping Meeting
Comment Summary

I. Public Scoping Summary

Public Scoping Period: August 14, 2007 – September 14, 2007
NOP released: August 10, 2007
Public Meeting: August 30, 2007, George Mayne Elementary in Alviso, 6-8pm
Scoping meeting attendance: 29

II. Summary of Public Comments (verbally addressed to District) on 8/30

Speaker	Comment(s)
Shawn Michaels	• How far does this project extend down the slough and what is the stopping point?
Russ Robinson	• In 1982, there was no vegetation in the slough and water depth under the docks was 12 feet • Alternative 5 does the best job of recreating the 1982 conditions and makes the most sense, even if it costs the most • Once Pond A8 notch comes in the vegetation will be killed.
Greg Martin	• Wants the area to be restored to 1982 conditions. Wants to be able to put a row boat in the slough • Asks if District can reduce the number of agencies involved in this project • Alternative 6 (no project) is the worst • Encourages District staff to move forward on the project
Tony Santos	• Discouraged by District Directors and Staff. Asks why there is no maintenance program in Alviso. Said "all Board and staff should be fired". • Asks why District paying consultants to create alternatives that don't meet the project objectives • Community needs Alternative 5 • Alternatives 1, 2, 3, do not meet community objectives
Roy Hayes	• Member of SBYC. Water quality samples are needed, especially out of the Guadalupe River; water is not salty enough for weed abatement
John Asuncion	• Supports Alternatives 4 and 5 as they would provide benefits to the community • Applauds District in going forward with any Alternative and is here to support staff. • The public wants access to slough
Tom Laine	• District must consider the natural (historic) flow of the Guadalupe River • This area was not previously "broke" and District should look into this natural flow path as an Alternative. • Has old pictures of the area if anyone would like to see them
Lourdes Rivera	• Environmental and social injustice has occurred in Alviso • Wants to see a stop to changes in project management at SCVWD (upper level change of management). • District needs to do this project right • Surprised to see Larry Wilson here since he has always been opposed to the project
Bob Gross	• 20% contingency for planning level cost estimate seems too high • Hoping that District is not doing any 'experimental' engineering

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Making San Francisco Bay Better

September 14, 2007

Michael F. Coleman, AICP
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

SUBJECT: Alviso Slough Restoration Project Notice of Preparation of a Draft Environmental Impact Report
(BCDC File No. 5-02)

Dear Mr. Coleman:

On August 13, 2007, the San Francisco Bay Conservation and Development Commission (Commission) staff received the Notice of Preparation (NOP) of a Draft Environmental Impact Report (DEIR) for the Alviso Slough Restoration Project, which would involve restoring Alviso Slough's channel width and habitat to prior to 1983 conditions. The goals of the project are to improve navigation, access and aesthetics; encourage the expansion of boating and other recreational and/or tourism opportunities; improve flood protection in Alviso Slough; reduce mosquito nuisance; and promote integration with the Salt Pond Restoration Program to bring salt water connections to the Lower Guadalupe River.

Although the Commission itself has not reviewed the NOP, the staff comments discussed below are based on the Commission's law, the McAteer-Petris Act, the Commission's *San Francisco Bay Plan* (Bay Plan), the Commission's federally-approved management plan for the San Francisco Bay, and the federal Coastal Zone Management Act (CZMA).

Jurisdiction

The Commission's permit jurisdiction includes all tidal areas of the Bay, including sloughs, up to the line of mean high tide or up to five feet above Mean Sea Level in marshlands, and the shoreline band that extends 100 feet inland from and parallel to the Bay jurisdiction. The Commission also has jurisdiction over certain managed wetlands, salt ponds, and certain waterways.

The Commission has previously issued Permit No. 5-02 to the Santa Clara Valley Water District for activities in tidal marsh adjacent to Alviso Slough, including periodic mowing of tidal marsh vegetation and debris removal to aid in conveying and directing flood flows from the Guadalupe River. Portions of the work discussed in the NOP for the Alviso Slough Restoration Project may be covered under Permit No. 5-02.

State of California • **SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION** • *Arnold Schwarzenegger, Governor*
50 California Street, Suite 2600 • San Francisco, California 94111 • (415) 352-3600 • Fax: (415) 352-3606 • info@bcdc.ca.gov • www.bcdc.ca.gov

Commission permits are required for placement of fill, construction, dredging, dredged material disposal, and substantial changes in use within its jurisdiction. Permits are issued when the Commission finds proposed activities to be consistent with its laws and policies. In addition to any needed permits under its state authority, federal actions, permits, and grants affecting the coastal zone are subject to review by the Commission, pursuant to the federal CZMA, for their consistency with the Commission's federally-approved coastal management program for the Bay.

From reviewing the NOP, it appears that the proposed project would include the following activities within the Commission's Bay and shoreline band jurisdictions: (1) vegetation and root mass removal to a depth of -4 feet Mean Lower Low Water (MLLW)[1]; (2) dredging to a depth of between -4 feet to -16 feet MLLW, depending on which project alternative is selected; and (3) dewatering the material in a staging area. Therefore, these activities will require a permit from the Commission.

Commission's Bay Jurisdiction

Minimize Harmful Effects to the Bay. Section 7.0 of the NOP discusses the possible environmental effects related to the proposed project. This section in the DEIR should include a discussion about the Commission's regulatory requirements governing the protection of the Bay's natural resources, including fish and wildlife, and certain habitat needed for their protection, including tidal flats and marshes and subtidal areas. Pursuant to the Bay Plan policies on Fish, Other Aquatic Organisms, and Wildlife, in evaluating Bay projects for authorization, the Commission must find that marshes, mudflats, and subtidal habitat would be "conserved, restored, and increased." Furthermore, in making this determination, the Commission must consult with and give appropriate consideration to the state and federal resource agencies, and not authorize any project resulting in a "taking" of a listed species unless found appropriate by the resource agencies.

According to the Bay Plan policies on tidal marshes and tidal flats, and subtidal areas, all projects subject to Commission consideration should also be sited and designed to minimize or avoid adverse resource impacts at these areas. And lastly, the Bay Plan policies regarding subtidal areas state, in part, that Commission approval of projects potentially disturbing these areas is partly contingent on the effect such projects would have on local and Bay-wide hydrology, sediment movement, bathymetry, and various other factors affecting the Bay. The DEIR should, at a minimum, acknowledge that the Commission has regulatory authority governing the protection of the Bay's natural resources and habitats per its laws and policies and discuss the project in light of the Commission's law and policies.

Tidal Marsh Vegetation. As discussed in Section 5.0 of the NOP, the proposed project will involve tidal marsh vegetation removal. According to the Bay Plan policies on tidal marshes and tidal flats, "projects that would substantially harm tidal marshes or tidal flats should be allowed only for purposes that provide substantial public benefits and only if there is no feasible alternative." The DEIR should address how the goals of the project can be achieved while minimizing the impacts on tidal marshes.

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Dredging. As discussed in Section 5.0 of the NOP, the proposed project may involve dredging in Alviso Slough. The NOP states that Alternatives 1 and 2 would involve vegetation and root mass removal only, while Alternatives 3, 4 and 5 would involve vegetation and root mass removal and dredging. Alternative 6 is the No Project alternative.

The Commission's dredging policies state, in part, that dredging should be authorized when the Commission can find that "dredging is needed to serve a water-oriented use or other important public purpose, such as navigational safety" and "the siting and design of the project will result in the minimum dredging volume necessary for the project. "The DEIR should address how the goals of the project can be achieved while minimizing the volume of dredging.

Dredged Material Disposal. The NOP states that, based on mercury levels in core samples collected in Alviso Slough to date, dredged sediments likely will not meet beneficial reuse requirements and would be disposed of at a local waste facility. It also states that dredged sediment would have to be dewatered in a staging area before disposal.

The DEIR should address dredging and disposal issues recognizing that: (1) the Dredged Material Management Office has not taken final action on the proposed dredged material quality or dewatering and disposal options; and (2) the Commission's policy preference is for beneficial reuse of dredged material, where feasible.

Work Windows and Agency Consultation. The NOP states that project activities could impact special status and/or endangered species, including Chinook salmon, steelhead, longfin smelt, North American green sturgeon, salt marsh harvest mouse, and clapper rail. The DEIR should address existing dredging work windows established to protect certain species, e.g., June 1st to November 30th to protect Chinook salmon and steelhead, and the agency consultations required for species that do not have work windows, e.g., clapper rail and salt marsh harvest mouse.

Water and Sediment Quality. The NOP states that the proposed project would increase turbidity in the water column. The DEIR should address whether any lateral movement of the plume would affect important habitat (e.g., eelgrass beds) whose viability is partly dependent on clarity of the water column.

The NOP states that the dredged sediment containing high mercury levels will be placed in a staging area for dewatering. Therefore, it is possible that the decant water flowing from the staging area may also have high mercury levels and may not be acceptable for discharge to the Bay. In addition, there is a potential that the placement of dredged material in the staging area could lead to contamination of the staging area and/or the underlying groundwater. The DEIR should analyze these possibilities.

The Commission's Water Quality Policies in the Bay Plan state, in part, that pollution in the Bay's water "should be prevented to the greatest extent feasible." Further, per the Bay Plan policies, the Commission would need to consult with and base its decision regarding the water quality impacts of the proposed project on evaluation by and advice of the San

Francisco Bay Regional Water Quality Control Board. Therefore, we request that the project proponents conduct early consultation with and obtain all necessary authorization from the Regional Board to aid the Commission in determining whether the project would adversely impact the Bay's water quality.

Mitigation. The Commission's policies regarding mitigation state, in part, that "projects should be designed to avoid adverse environmental impacts to [the] Bay" and, further, that "[w]henever adverse impacts cannot be avoided, they should be minimized to the greatest extent practicable....[and] measures to compensate for...impacts should be required." In the event that the proposed project would result in adverse environmental impacts that cannot be avoided, the DEIR should propose mitigating measures.

Commission's Shoreline Band Jurisdiction

The NOP does not include a map that identifies the proposed dewatering staging area in relation to the Commission's 100-foot shoreline band jurisdiction. However, it is possible that the staging area would be located in the Commission's shoreline band jurisdiction. Section 66602 of the McAteer-Petris Act states, in part, that: "...that maximum feasible public access, consistent with a proposed project, should be provided."

Public Access. The DEIR should discuss and analyze the potential impacts of the project on public access. Should it be determined that the project would need to provide public access, the project proponent should initiate the process of exploring and preparing appropriate public access improvements as early as possible in the planning process. In addition, it would be helpful if the DEIR included a map of existing or planned San Francisco Bay Trail segments and existing and planned public shoreline access, and the location of these features in relation to the project site.

Public Views. Based on its regulations, the Commission must consider a project's potential impacts on public views of the Bay. Further, the Commission's Bay Plan policies on appearance, design and scenic views state, in part, that "[a]ll bayfront development should be designed to enhance the pleasure of the user or viewer of the Bay. Maximum efforts should be made to provide, enhance, or preserve views of the Bay and shoreline, especially from public areas...." Therefore, the DEIR should include figures that depict the potential view impact of the project from the immediate and nearest public road showing how views of the Bay would be affected from that location.

Thank you for the opportunity to comment on this NOP. If you have any questions regarding this letter or the Commission's policies, please contact me at (415) 352-3660 or jessicah@bcdc.ca.gov.

Sincerely,

JESSICA HAMBURGER
Coastal Program Analyst

JH/rca

cc: State Clearinghouse

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bcdc
Making San Francisco Bay Better

September 14, 2007

Michael F. Coleman, AICP
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

SUBJECT: Alviso Slough Restoration Project Notice of Preparation of a Draft Environmental Impact Report
(BCDC File No. 5-02)

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Sincerely,

JESSICA HAMBURGER
Coastal Program Analyst

JH/rca

cc: State Clearinghouse

Fish, Other Aquatic Organisms and Wildlife

species, such as Chinook salmon and Delta smelt, by the United States Fish and Wildlife Service and the National Marine Fisheries Service because the Bay plays an essential role in their life cycles. The Magnuson-Stevens Act requires that the National Marine Fisheries Service provide conservation recommendations to state agencies, such as the Commission, when a proposed project would have adverse impacts on essential fish habitat.

i. The Baylands Ecosystem Habitat Goals report provides a regional vision of the types, amounts, and distribution of wetlands and related habitats that are needed to restore and sustain a healthy Bay ecosystem, including the improvement of the well-being of many plant and animal species currently at risk of extinction.

Policies

1. To assure the benefits of fish, other aquatic organisms and wildlife for future generations, to the greatest extent feasible, the Bay's tidal marshes, tidal flats, and subtidal habitat should be conserved, restored and increased.

2. Specific habitats that are needed to conserve, increase or prevent the extinction of any native species, species threatened or endangered, species that the California Department of Fish and Game has determined are candidates for listing as endangered or threatened under the California Endangered Species Act, or any species that provides substantial public benefits, should be protected, whether in the Bay or behind dikes.

3. In reviewing or approving habitat restoration programs the Commission should be guided by the recommendations in the Baylands Ecosystem Habitat Goals report and should, where appropriate, provide for a diversity of habitats to enhance opportunities for a variety of associated native aquatic and terrestrial plant and animal species.

4. The Commission should:

   (a) Consult with the California Department of Fish and Game and the U.S. Fish and Wildlife Service or the National Marine Fisheries Service whenever a proposed project may adversely affect an endangered or threatened plant, fish, other aquatic organism or wildlife species;

   (b) Not authorize projects that would result in the "taking" of any plant, fish, other aquatic organism or wildlife species listed as endangered or threatened pursuant to the state or federal endangered species acts, or the federal Marine Mammal Protection Act, or species that are candidates for listing under the California Endangered Species Act, unless the project applicant has obtained the appropriate "take" authorization from the U.S. Fish and Wildlife Service, National Marine Fisheries Service or the California Department of Fish and Game; and

   (c) Give appropriate consideration to the recommendations of the California Department of Fish and Game, the National Marine Fisheries Service or the United States Fish and Wildlife Service in order to avoid possible adverse effects of a proposed project on fish, other aquatic organisms and wildlife habitat.

5. The Commission may permit a minor amount of fill or dredging in wildlife refuges, shown on the Plan Maps, necessary to enhance fish, other aquatic organisms and wildlife habitat or to provide public facilities for wildlife observation, interpretation and education.

Amended April 2002

Water Quality

Policies

1. Bay water pollution should be prevented to the greatest extent feasible. The Bay's tidal marshes, tidal flats, and water surface area and volume should be conserved and, whenever possible, restored and increased to protect and improve water quality. Fresh water inflow into the Bay should be maintained at a level adequate to protect Bay resources and beneficial uses.

2. Water quality in all parts of the Bay should be maintained at a level that will support and promote the beneficial uses of the Bay as identified in the San Francisco Bay Regional Water Quality Control Board's *Water Quality Control Plan, San Francisco Bay Basin* and should be protected from all harmful or potentially harmful pollutants. The policies, recommendations, decisions, advice and authority of the State Water Resources Control Board and the Regional Board, should be the basis for carrying out the Commission's water quality responsibilities.

3. New projects should be sited, designed, constructed and maintained to prevent or, if prevention is infeasible, to minimize the discharge of pollutants into the Bay by: (a) controlling pollutant sources at the project site; (b) using construction materials that contain non-polluting materials; and (c) applying appropriate, accepted and effective best management practices, especially where water dispersion is poor and near shellfish beds and other significant biotic resources.

4. When approving a project in an area polluted with toxic or hazardous substances, the Commission should coordinate with appropriate local, state and federal agencies to ensure that the project will not cause harm to the public, to Bay resources, or to the beneficial uses of the Bay.

5. The Commission should support the efforts of federal, state, and local agencies in developing nonpoint source pollution control programs.

6. To protect the Bay and its tributaries from the water quality impacts of nonpoint source pollution, new development should be sited and designed consistent with standards in municipal stormwater permits and state and regional stormwater management guidelines, where applicable, and with the protection of Bay resources. To offset impacts from increased impervious areas and land disturbances, vegetated swales, permeable pavement materials, preservation of existing trees and vegetation, planting native vegetation and other appropriate measures should be evaluated and implemented where appropriate.

7. Whenever practicable, native vegetation buffer areas should be provided as part of a project to control pollutants from entering the Bay, and vegetation should be substituted for rock riprap, concrete, or other hard surface shoreline and bank erosion control methods where appropriate and practicable.

Amended June 2003

Tidal Marshes and Tidal Flats

Policies

1. Tidal marshes and tidal flats should be conserved to the fullest possible extent. Filling, diking, and dredging projects that would substantially harm tidal marshes or tidal flats should be allowed only for purposes that provide substantial public benefits and only if there is no feasible alternative.

2. Any proposed fill, diking, or dredging project should be thoroughly evaluated to determine the effect of the project on tidal marshes and tidal flats, and designed to minimize, and if feasible, avoid any harmful effects.

3. Projects should be sited and designed to avoid, or if avoidance is infeasible, minimize adverse impacts on any transition zone present between tidal and upland habitats. Where a transition zone does not exist and it is feasible and ecologically appropriate, shoreline projects should be designed to provide a transition zone between tidal and upland habitats.

4. Where and whenever possible, former tidal marshes and tidal flats that have been diked from the Bay should be restored to tidal action in order to replace lost historic wetlands or should be managed to provide important Bay habitat functions, such as resting, foraging and breeding habitat for fish, other aquatic organisms and wildlife. As recommended in the Baylands Ecosystem Habitat Goals report, around 65,000 acres of areas diked from the Bay should be restored to tidal action. Further, local government land use and tax policies should not lead to the conversion of these restorable lands to uses that would preclude or deter potential restoration. The public should make every effort to acquire these lands from willing sellers for the purpose of restoration.

5. Any tidal restoration project should include clear and specific long-term and short-term biological and physical goals, and success criteria and a monitoring program to assess the sustainability of the project. Design and evaluation of the project should include an analysis of: (a) the effects of relative sea level rise; (b) the impact of the project on the Bay's sediment budget; (c) localized sediment erosion and accretion; (d) the role of tidal flows; (e) potential invasive species introduction, spread, and their control; (f) rates of colonization by vegetation; (g) the expected use of the site by fish, other aquatic organisms and wildlife; and (h) site characterization. If success criteria are not met, appropriate corrective measures should be taken.

6. Non-native species should not be used in habitat restoration projects. Any habitat restoration project approved by the Commission should include a program for the periodic monitoring of the site for non-native species and a program for control and, if appropriate and feasible, eradication should an introduction occur. The use of non-native plant species in public access landscape improvements should be avoided where a potential exists for non-native plants to spread into the Bay, other waterways, or transition zones between tidal and upland habitats.

7. The Commission should continue to support and encourage the expansion of scientific information on the arrival and spread of invasive plants and animals, and when feasible, support the establishment of a regional effort for Bay-wide eradication of specific invasive species, such as non-native cordgrasses.

8. Based on scientific ecological analysis and consultation with the relevant federal and state resource agencies, a minor amount of fill may be authorized to enhance or restore fish, other aquatic organisms or wildlife habitat if the Commission finds that no other method of enhancement or restoration except filling is feasible.

Amended April 2002

Subtidal Areas

e. The mixing zone, also referred to as the entrapment or null zone, is centered in Suisun Bay where less-dense, fresh water flowing seaward out of the Delta and more-dense, salt water flowing landward on the tides into the Bay from the Pacific Ocean meet and mix producing an abundance of suspended nutrients and creating one of the Bay's most productive areas for fish and other aquatic organisms. Mixing zones also occur at a smaller scale where rivers and streams flowing into the Bay meet tidal waters.

f. Some parts of the Bay are particularly important to certain species of fish, other aquatic organisms and wildlife due to their high native biodiversity, productivity or scarcity (e.g., deep water over sand shoals, the mixing zone, oyster reefs, shallow and calm areas, eelgrass beds, areas where seaweed is found, and where tidal eddies, retention zones and fronts concentrate prey).

g. The Bay is a dynamic ecosystem influenced by natural processes on tidal and seasonal scales, as well as by events that occur annually or on longer-term scales. The depth and shape of the Bay (its bathymetry) is at any moment the result of the interacting forces of erosion and deposition of sediment. This natural balance has changed during the past 150 years due to such human actions as hydraulic mining (increased sediment input), dam construction (reduced sediment input), water diversion, filling, diking, and dredging, all of which have significantly altered the Bay's historic sedimentary processes.

h. Unlike land-based habitats, the Bay's subtidal areas are not easily divided into habitat classification categories. However, location can be very important. For example, fronts, stratification, turbulence, wastewater input, and fish aggregation can be quite local in nature. Furthermore, the value of a particular subtidal area to a species is influenced by the Bay's physical characteristics (including sediment type, depth, salinity, temperature and currents), by process (such as sediment movement, sand replenishment, wind and wave action, erosion and deposition), and biological features (including concentration of food or linkages between habitats). Thus, although general guidelines can be developed on a regional scale, the evaluation of specific projects requires knowledge of local conditions. In particular, local bathymetric features, which may have the greatest influence on physical, chemical, or biological properties, should receive great attention, since small changes in bathymetry may have unexpectedly large influences.

i. Major gaps in scientific knowledge exist about the subtidal areas of the Bay due to the dynamic nature of the system and the complexity of linkages between subtidal areas and the fish, other aquatic organisms and wildlife which depend upon them to rest, forage and breed.

j. Fill material, such as rock, oyster shells and sediments dredged from the Bay, can enhance or beneficially contribute to the restoration of subtidal habitat by: (1) creating varied subtidal areas beneficial to aquatic species, such as Pacific herring; (2) restoring native oyster reefs; (3) enhancing subtidal plant communities, such as eelgrass beds; and (4) recreating the bathymetry of disturbed areas, such as dredged channels.

Policies

1. Any proposed filling or dredging project in a subtidal area should be thoroughly evaluated to determine the local and Bay-wide effects of the project on: (a) the possible introduction or spread of invasive species; (b) tidal hydrology and sediment movement; (c) fish, other aquatic organisms and wildlife; (d) aquatic plants; and (e) the Bay's bathymetry. Projects in subtidal areas should be designed to minimize and, if feasible, avoid any harmful effects.

2. Subtidal areas that are scarce in the Bay or have an abundance and diversity of fish, other aquatic organisms and wildlife (e.g., eelgrass beds, sandy deep water or underwater pinnacles) should be conserved. Filling, changes in use, and dredging projects in these areas should therefore be allowed only if: (a) there is no feasible alternative; and (b) the project provides substantial public benefits.

Subtidal Areas

3. Subtidal restoration projects should be designed to: (a) promote an abundance and diversity of fish, other aquatic organisms and wildlife; (b) restore rare subtidal areas; (c) establish linkages between deep and shallow water and tidal and subtidal habitat in an effort to maximize habitat values for fish, other aquatic organisms and wildlife; or (d) expand open water areas in an effort to make the Bay larger.

4. Any subtidal restoration project should include clear and specific long-term and short-term biological and physical goals, and success criteria and a monitoring program to assess the sustainability of the project. Design and evaluation of the project should include an analysis of: (a) the scientific need for the project; (b) the effects of relative sea level rise; (c) the impact of the project on the Bay's sediment budget; (d) localized sediment erosion and accretion; (e) the role of tidal flows; (f) potential invasive species introduction, spread and their control; (g) rates of colonization by vegetation, where applicable; (h) the expected use of the site by fish, other aquatic organisms and wildlife; and (i) characterization of and changes to local bathymetric features. If success criteria are not met, corrective measures should be taken.

5. The Commission should continue to support and encourage expansion of scientific information on the Bay's subtidal areas, including: (a) inventory and description of the Bay's subtidal areas; (b) the relationship between the Bay's physical regime and biological populations; (c) sediment dynamics, including sand transport, and wind and wave effects on sediment movement; (d) areas of the Bay used for spawning, birthing, nesting, resting, feeding, migration, among others, by fish, other aquatic organisms and wildlife; and (e) where and how restoration should occur.

6. Based on scientific ecological analysis and consultation with the relevant federal and state resource agencies, a minor amount of fill may be authorized to enhance or restore fish, other aquatic organisms or wildlife habitat if the Commission finds that no other method of enhancement or restoration except filling is feasible.

Adopted April 2002

Public Access

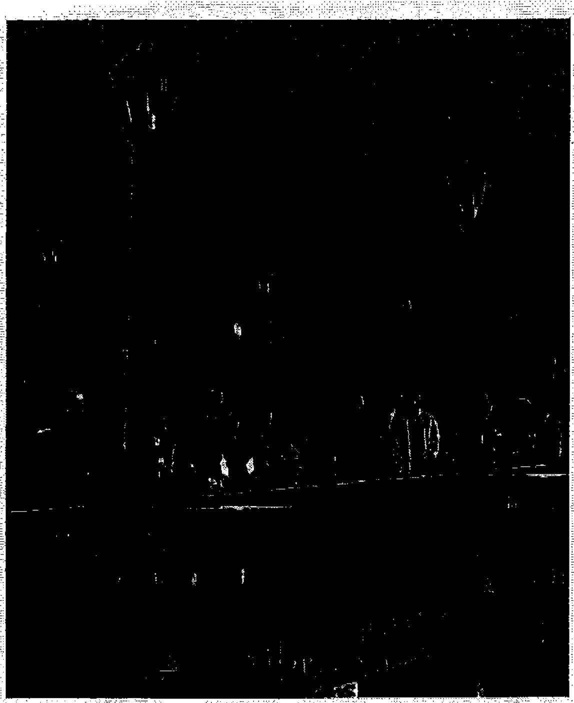
Policies

1. A proposed fill project should increase public access to the Bay to the maximum extent feasible, in accordance with the policies for Public Access to the Bay.

2. In addition to the public access to the Bay provided by waterfront parks, beaches, marinas, and fishing piers, maximum feasible access to and along the waterfront and on any permitted fills should be provided in and through every new development in the Bay or on the shoreline, whether it be for housing, industry, port, airport, public facility, wildlife area, or other use, except in cases where public access would be clearly inconsistent with the project because of public safety considerations or significant use conflicts, including unavoidable, significant adverse effects on Bay natural resources. In these cases, in lieu access at another location preferably near the project should be provided.

3. Public access to some natural areas should be provided to permit study and enjoyment of these areas. However, some wildlife are sensitive to human intrusion. For this reason, projects in such areas should be carefully evaluated in consultation with appropriate agencies to determine the appropriate location and type of access to be provided.

4. Public access should be sited, designed and managed to prevent significant adverse effects on wildlife. To the extent necessary to understand the potential effects of public access on wildlife, information on the species and habitats of a proposed project site should be provided, and the likely human use of the access area analyzed. In determining the potential for significant adverse effects (such as impacts on endangered species, impacts on breeding and foraging areas, or fragmentation of wildlife corridors), site specific information provided by the project applicant, the best available scientific evidence, and expert advice should be used. In addition, the determination of significant adverse effects may also be considered within a regional context. Siting, design and management strategies should be employed to avoid or minimize adverse effects on wildlife, informed by the advisory principles in the Public Access Design Guidelines. If significant adverse effects cannot be avoided or reduced to a level below significance through siting, design and management strategies, then in lieu public access should be provided, consistent with the project and providing public access benefits equivalent to those that would have been achieved from on-site access. Where appropriate, effects of public access on wildlife should be monitored over time to determine whether revisions of management strategies are needed.



5. Whenever public access to the Bay is provided as a condition of development, on fill or on the shoreline, the access should be permanently guaranteed. This should be done wherever appropriate by requiring dedication of fee title or easements at no cost to the public, in the same manner that streets, park sites, and school sites are dedicated to the public as part of the subdivision process in cities and counties.

6. Public access improvements provided as a condition of any approval should be consistent with the project and the physical environment, including protection of Bay natural resources, such as aquatic life, wildlife and plant communities, and provide for the public's safety and convenience. The improvements should

Public Access

be designed and built to encourage diverse Bay-related activities and movement to and along the shoreline, should permit barrier free access for the physically handicapped to the maximum feasible extent, should include an ongoing maintenance program, and should be identified with appropriate signs.

7. In some areas, a small amount of fill may be allowed if the fill is necessary and is the minimum absolutely required to develop the project in accordance with the Commission's public access requirements.

8. Access to and along the waterfront should be provided by walkways, trails, or other appropriate means and connect to the nearest public thoroughfare where convenient parking or public transportation may be available. Diverse and interesting public access experiences should be provided which would encourage users to remain in the designated access areas to avoid or minimize potential adverse effects on wildlife and their habitat.

9. Roads near the edge of the water should be designed as scenic parkways for slow-moving, principally recreational traffic. The roadway and right-of-way design should maintain and enhance visual access for the traveler, discourage through traffic, and provide for safe, separated, and improved physical access to and along the shore. Public transit use and connections to the shoreline should be encouraged where appropriate.

10. Federal, state, regional, and local jurisdictions, special districts, and the Commission should cooperate to provide appropriately sited, designed and managed public access, especially to link the entire series of shoreline parks, regional trail systems (such as the San Francisco Bay Trail) and existing public access areas to the extent feasible without additional Bay filling and without significant adverse effects on Bay natural resources. State, regional, and local agencies that approve projects should assure that provisions for public access to and along the shoreline are included as conditions of approval and that the access is consistent with the Commission's requirements and guidelines.

11. The Public Access Design Guidelines should be used as a guide to siting and designing public access consistent with a proposed project. The Design Review Board should advise the Commission regarding the adequacy of the public access proposed.

12. Public access should be integrated early in the planning and design of Bay habitat restoration projects to maximize public access opportunities and to avoid significant adverse effects on wildlife.

13. The Commission should continue to support and encourage expansion of scientific information on the effects of public access on wildlife and the potential of siting, design and management to avoid or minimize impacts. Furthermore, the Commission should, in cooperation with other appropriate agencies and organizations, determine the location of sensitive habitats in San Francisco Bay and use this information in the siting, design and management of public access along the shoreline of San Francisco Bay.

Amended March 2001

Appearance, Design, and Scenic Views.

Policies

1. To enhance the visual quality of development around the Bay and to take maximum advantage of the attractive setting it provides, the shores of the Bay should be developed in accordance with the Public Access Design Guidelines.

2. All bayfront development should be designed to enhance the pleasure of the user or viewer of the Bay. Maximum efforts should be made to provide, enhance, or preserve views of the Bay and shoreline, especially from public areas, from the Bay itself, and from the opposite shore. To this end, planning of waterfront development should include participation by professionals who are knowledgeable of the Commission's concerns, such as landscape architects, urban designers, or architects, working in conjunction with engineers and professionals in other fields.

3. In some areas, a small amount of fill may be allowed if the fill is necessary—and is the minimum absolutely required—to develop the project in accordance with the Commission's design recommendations.

4. Structures and facilities that do not take advantage of or visually complement the Bay should be located and designed so as not to impact visually on the Bay and shoreline. In particular, parking areas should be located away from the shoreline. However, some small parking areas for fishing access and Bay viewing may be allowed in exposed locations.

5. To enhance the maritime atmosphere of the Bay Area, ports should be designed, whenever feasible, to permit public access and viewing of port activities by means of (a)-view points (e.g., piers, platforms, or towers), restaurants, etc., that would not interfere with port operations, and (b)-openings between buildings and other site designs that permit views from nearby roads.

6. Additional bridges over the Bay should be avoided, to the extent possible, to preserve the visual impact of the large expanse of the Bay. The design of new crossings deemed necessary should relate to others nearby and should be located between promontories or other land forms that naturally suggest themselves as connections reaching across the Bay (but without destroying the obvious character of the promontory). New or remodeled bridges across the Bay should be designed to permit maximum viewing of the Bay and its surroundings by both motorist and pedestrians. Guard rails and bridge supports should be designed with views in mind.

7. Access routes to Bay crossings should be designed so as to orient the traveler to the Bay (as in the main approaches to the Golden Gate Bridge). Similar consideration should be given to the design of highway and mass transit routes paralleling the Bay (by providing frequent views of the Bay, if possible, so the traveler knows which way he or she is moving in relation to the Bay). Guardrails, fences, landscaping, and other structures related to such routes should be designed and located so as to maintain and to take advantage of Bay views. New or rebuilt roads in the hills above the Bay and in areas along the shores of the Bay should be constructed as scenic parkways in order to take full advantage of the commanding views of the Bay.

8. Shoreline developments should be build in clusters, leaving open area around them to permit more frequent views of the Bay. Developments along the shores of tributary waterways should be Bay-related and should be designed to preserve and enhance views along the waterway, so as to provide maximum visual contact with the Bay.

9. "Unnatural" debris should be removed from sloughs, marshes, and mudflats that are retained as part of the ecological system. Sloughs, marshes, and mudflats should be restored to their former natural state if they have been despoiled by human activities.

10. Towers, bridges, or other structures near or over the Bay should be designed as landmarks that suggest the location of the waterfront when it is not visible, especially in flat areas. But such landmarks should be low enough to assure the continued visual dominance of the hills around the Bay.

Appearance, Design, and Scenic Views

11. In areas of the Bay where oil and gas drilling or production platforms are permitted, they should be treated or screened, including derrick removal, so they will be compatible with the surrounding open water, mudflat, marsh or shore area.

12. In order to achieve a high level of design quality, the Commission's Design Review Board, composed of design and planning professionals, should review, evaluate, and advise the Commission on the proposed design of developments that affect the appearance of the Bay in accordance with the Bay Plan findings and policies on Public Access; on Appearance, Design, and Scenic Views; and the Public Access Design Guidelines. City, county, regional, state, and federal agencies should be guided in their evaluation of bayfront projects by the above guidelines.

13. Local governments should be encouraged to eliminate inappropriate shoreline uses and poor quality shoreline conditions by regulation and by public actions (including development financed wholly or partly by public funds). The Commission should assist in this regard to the maximum feasible extent by providing advice on Bay-related appearance and design issues, and by coordinating the activities of the various agencies that may be involved with projects affecting the Bay and its appearance.

14. Views of the Bay from vista points and from roads should be maintained by appropriate arrangements and heights of all developments and landscaping between the view areas and the water. In this regard, particular attention should be given to all waterfront locations, areas below vista points, and areas along roads that provide good views of the Bay for travelers, particularly areas below roads coming over ridges and providing a "first view" of the Bay (shown in Bay Plan Map No. 8, Natural Resources of the Bay).

15. Vista points should be provided in the general locations indicated in the Plan maps. Access to vista points should be provided by walkways, trails, or other appropriate means and connect to the nearest public thoroughfare where parking or public transportation is available. In some cases, exhibits, museums, or markers would be desirable at vista points to explain the value or importance of the areas being viewed.

Amended April 1979

Mitigation

recreational and aesthetic benefits. Therefore, there may be social and economic effects on nearby communities as a result of impacts on existing resource areas and the siting and design of compensatory mitigation projects.

g. The required area and type of compensatory mitigation may vary depending on factors such as: the expected time delay between the impact and the functioning of the mitigation project; the relative quality of the mitigation and the impacted site; the type of mitigation (e.g., restoration, creation, enhancement); and the probability of success of the mitigation project.

h. Mitigation banking involves restoring or creating natural resources to produce mitigation "credits" which can be used to offset unavoidable adverse impacts to existing resources. A mitigation bank is a site where resources are restored, created, or enhanced expressly for the purpose of providing compensatory mitigation in advance of impacts associated with authorized projects. Mitigation banks may be established by individuals who anticipate needing to mitigate for future impacts, or by third parties who develop banks as a commercial venture to sell credits to permittees needing to provide compensatory mitigation. Among other benefits, mitigation banks provide the unique opportunity to address the cumulative effects of small fill projects that are too small to be mitigated individually. Provided mechanisms are in place to assure success, mitigation banking can provide a timely, convenient, cost effective and ecologically successful mitigation option.

i. Fee-based mitigation involves the submittal of a fee by the permittee in-lieu of requiring the permittee to undertake the creation, restoration, or enhancement of a specific mitigation site, or purchasing credits from a mitigation bank. The fee is generally submitted to a third party for implementation of an ongoing or future restoration-creation project. Provided mechanisms are in place to assure success, fee-based mitigation can also provide a timely, convenient, cost effective and ecologically successful mitigation option.

Policies

1. Projects should be designed to avoid adverse environmental impacts to Bay natural resources such as to water surface area, volume, or circulation and to plants, fish, other aquatic organisms and wildlife habitat, subtidal areas, or tidal marshes or tidal flats. Whenever adverse impacts cannot be avoided, they should be minimized to the greatest extent practicable. Finally, measures to compensate for unavoidable adverse impacts to the natural resources of the Bay should be required. Mitigation is not a substitute for meeting the other requirements of the McAteer-Petris Act.

2. Individual compensatory mitigation projects should be sited and designed within a Bay-wide ecological context, as close to the impact site as practicable, to: (1) compensate for the adverse impacts; (2) ensure a high likelihood of long-term ecological success; and (3) support the improved health of the Bay ecological system. Determination of the suitability of proposed mitigation locations should be guided in part by the information provided in the *Baylands Ecosystem Habitat Goals* report.

3. When determining the appropriate location and design of compensatory mitigation, the Commission should also consider potential effects on benefits provided to humans from Bay natural resources, including economic (e.g., flood protection, erosion control) and social (e.g., aesthetic benefits, recreational opportunities).

4. The amount and type of compensatory mitigation should be determined for each mitigation project based on a clearly identified rationale that includes an analysis of: the probability of success of the mitigation project; the expected time delay between the impact and the functioning of the mitigation site; and the type and quality of the ecological functions of the proposed mitigation site as compared to the impacted site.

5. To increase the potential for the ecological success and long-term sustainability of compensatory mitigation projects, resource restoration should be selected over creation where practicable, and transition zones and

Mitigation

buffers should be included in mitigation projects where feasible and appropriate. In addition, mitigation site selection should consider site specific factors that will increase the likelihood of long-term ecological success, such as existing hydrological conditions, soil type, adjacent land uses, and connections to other habitats.

6. Mitigation should, to the extent practicable, be provided prior to, or concurrently with those parts of the project causing adverse impacts.

7. When compensatory mitigation is necessary, a mitigation program should be reviewed and approved by or on behalf of the Commission as part of the project. Where appropriate, the mitigation program should describe the proposed design, construction and management of mitigation areas and include:

   (a) Clear mitigation project goals;

   (b) Clear and measurable performance standards for evaluating the success of the mitigation project, based on measures of both composition and function, and including the use of reference sites;

   (c) A monitoring plan designed to identify potential problems early and determine appropriate remedial actions. Monitoring and reporting should be of adequate frequency and duration to measure specific performance standards and to assure long-term success of the stated goals of the mitigation project;

   (d) A contingency plan to ensure the success of the mitigation project, or provide means to ensure alternative appropriate measures are implemented if the identified mitigation cannot be modified to achieve success. The Commission may require financial assurances, such as performance bonds or letters of credit, to cover the cost of mitigation actions based on the nature, extent and duration of the impact and/or the risk of the mitigation plan not achieving the mitigation goals; and

   (e) Provisions for the long-term maintenance, management and protection of the mitigation site, such as a conservation easement, cash endowment, and transfer of title.

8. Mitigation programs should be coordinated with all affected local, state, and federal agencies having jurisdiction or mitigation expertise to ensure, to the maximum practicable extent, a single mitigation program that satisfies the policies of all the affected agencies.

9. If more than one mitigation program is proposed, the Commission should consider the cost of the alternatives in determining the appropriate program.

10. To encourage cost effective compensatory mitigation programs, especially to provide mitigation for small fill projects, the Commission may extend credit for certain fill removal and allow mitigation banking provided that any credit or resource bank is recognized pursuant to written agreement executed by the Commission. Mitigation bank agreements should include: (a) financial mechanisms to ensure success of the bank; (b) assignment of responsibility for the ecological success of the bank; (c) scientifically defensible methods for determining the timing and amount of credit withdrawals; and (d) provisions for long-term maintenance, management and protection of the bank site. Mitigation banking should only be considered when no mitigation is practicable on or proximate to the project site.

11. The Commission may allow fee-based mitigation when other compensatory mitigation measures are infeasible. Fee-based mitigation agreements should include: (a) identification of a specific project that the fees will be used for within a specified time frame; (b) provisions for accurate tracking of the use of funds; (c) assignment of responsibility for the ecological success of the mitigation project; (d) determination of fair and adequate fee rates that account for all financial aspects of the mitigation project, including costs of securing sites, construction costs, maintenance costs,

Mitigation

and administrative costs; (e) compensation for time lags between the adverse impact and the mitigation; and (f) provisions for long-term maintenance, management and protection of the mitigation site.

Amended October 2002

Public Trust

Findings and Policies Concerning the Public Trust

Findings

a. Virtually all the publicly and privately-held unfilled tidelands and submerged lands within the jurisdiction of the Commission are subject to the public trust.

b. The public trust is a paramount public property right held in trust by the state for the benefit of the public.

c. Title to this public trust ownership is vested in the State Lands Commission or legislative grantees.

d. The purpose of the public trust is to assure that the lands to which it pertains are kept for trust uses, such as commerce, navigation, fisheries, wildlife habitat, recreation, and open space.

e. The McAteer-Petris Act and the Bay Plan are an exercise of authority by the Legislature over public trust lands and establish policies for meeting public trust needs.

f. As a result, the public trust ownership provides additional support for Commission decisions affecting such lands.

Policies

1. When the Commission takes any action affecting lands subject to the public trust, it should assure that the action is consistent with the public trust needs for the area and, in case of lands subject to legislative grants, should also assure that the terms of the grant are satisfied and the project is in furtherance of statewide purposes.

Cargill Salt

August 20, 2007

Michael F. Coleman, AICP
Project Manager/Environmental Planner
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Subject: Alviso Slough Restoration Project – NOP of a Draft EIR
Cargill file #: 203.001:5, 203.001:6, 220.001:12

Dear Mr. Coleman:

First I would like to thank you for sending me the NOP of the draft EIR for the Alviso Slough Restoration Project. We, Cargill and its predecessor Leslie Salt, have had a positive, long-standing relationship with SCVWD. We are routinely engaged with the district mostly due to either our property ownership or our knowledge of the South San Francisco Bay. We are also very familiar with the South Bay Salt Pond Restoration Project and remain to be stakeholders in the project.

That said I do have one important comment that I would like to be incorporated in the EIR. Under Section 3.0 RELATED PROJECT – South Bay Salt Ponds Restoration Project, second paragraph. The last sentence states "The Phase 1 Action includes a constructed 'notch' that can be opened from 0 to 40 feet in width (20-foot increments), that will control water flow between Pond A8 and Alviso Slough." The proposed location of the 'notch' is not shown on any of the maps that were included in the NOP. I have been having discussions with the district staff regarding this 'notch', its location, and how it is to be incorporated in with the South Bay Salt Pond Restoration Project. The SCVWD staff has supplied me with a map showing the location of this proposed 'notch' simply because Cargill is the current landowner of this property. I have made it quite clear to both the district staff as well as the South Bay Salt Pond Restoration Project team that no construction will be allowed to take place as long as Cargill retains ownership of this property. Cargill has been engaged in discussion with the SCVWD regarding this property transfer now for the past ten years and to be quite frank, it has been a very frustrating process. SCVWD has occupied the site for the past four years and has already altered the site for its benefit. The following comments should be incorporated in the EIR:

- Please note that Cargill is the current property owner for where the 'notch' is to be located and that a transfer of ownership is required in order for construction to take place.
- Figure 2: Project Area to show the boundary of Cargill's property and show the proposed location of the 'notch'.

I would be happy to discuss this further with the district if necessary; otherwise I look forward to participating in this process. Please feel free to give me a call at (510) 790-8610 or alternatively you can email me at pat_mapelli@cargill.com.

Sincerely,

Patrick D. Mapelli
Manager, Real Property
Cargill Salt
7220 Central Avenue
Newark, CA 94560

Cc: Clyde Morris, Refuge Manager – DESBNWRC
Steve Ritchie, Project Manager – SBSPRP
Beth Dyer, Senior Project Manager – SCVWD
Ngoc H. Nguyen, Senior Project Manager – SCVWD
Rahn K. Springer, Associate Real Estate Agent – SCVWD

State of California – The Resources Agency **ARNOLD SCHWARZENEGGER, Governor**
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
POST OFFICE BOX 47
YOUNTVILLE, CALIFORNIA 94599
(707) 944-5500

September 6, 2007

Mr. Mike Coleman
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Dear Mr. Coleman:

Subject: Comments on Notice of Preparation for the Alviso Slough Restoration Project Draft Environmental Impact Report (SCH # 2007082071)

This letter is to inform you that the California Department of Fish and Game (DFG) has reviewed the Santa Clara Valley Water District's (District) Notice of Preparation (NOP) for the Alviso Slough Restoration Project Draft Environmental Impact Report (EIR) (SCH # 2007082071). The District proposes to evaluate a range of alternatives that would entail varying degrees of vegetation and sediment removal to accomplish the following objectives: 1) restore Alviso Slough's channel width and habitat prior to 1983 conditions; 2) improve the community's ability to pursue navigation, public access, and aesthetics to allow for the expansion of boating and other recreational and/or tourism opportunities; 3) maintain one percent flood protection in Alviso Slough; 4) reduce mosquito nuisance; and 5) promote the integration with the Salt Pond Restoration Program (including the Pond AB Applied Study) to bring salt water connections to the Lower Guadalupe River.

The project is located within the banks of Alviso Slough, from Gold Street Bridge to Alviso Marina County Park. The District proposes the evaluation of five alternatives in addition to a No-Project alternative. The alternatives vary from the removal of a minimum of 2.6 acres of vegetation up to a removal of 15.3 acres of vegetation and 9.7 acres of sediment.

The NOP identifies several special-status species that would be potentially impacted as a result of carrying out the proposed project. The salt marsh harvest mouse (*Reithrodontomys raviventris*) (SMHM) and the California clapper rail (*Rallus longirostris obsoletus*) are both State and Federally endangered and State fully protected species. Fully protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research. Trapping as a mitigation measure is considered "take" and is a violation of State law. DFG expects that the District will develop and disclose appropriate mitigation measures to ensure avoidance which does not cause "take" of the SMHM or California clapper rail.

The NOP briefly mentions the potential vegetation removal methods which could be utilized in the project, including mechanical, hand removal, and chemical treatment methods. Mechanical methods, including the use of an Aquamog, may result in impacts to both aquatic and terrestrial species through direct mortality, reduction of habitat, or increases in turbidity. Chemical treatments may impact both terrestrial and aquatic species as a result of water quality issues, reduction in habitat, or direct mortality of species exposed to the chemicals. DFG expects that the District will fully describe potential impacts associated with any proposed vegetation removal methods and develop appropriate mitigation measures which will avoid and minimize adverse effects to both terrestrial and aquatic species.

Removal of vegetation and sediment will reduce the habitat available to both terrestrial and aquatic species. Removal of between 2.6 acres and 15.3 acres of vegetation and up to 9.7 acres of sediment could result in very substantial impacts to breeding, rearing, and foraging habitat for a variety of fish and wildlife species, including salmonids, green sturgeon (*Acipenser medirostris*), longfin smelt (*Spirinchus thaleichthys*), various species of marsh birds, and SMHM. DFG requests that the District provide a thorough analysis of any special-status plants that may be impacted by this project and expects that the District will fully describe the potential impacts of this project to biological resources and develop a mitigation and monitoring plan that will adequately compensate for the loss of habitat to affected species.

For any activity that will divert or obstruct the natural flow, or change the bed, channel, or bank (which may include associated riparian resources) of a river or stream, or use material from a streambed, DFG may require a Streambed Alteration Agreement (SAA), pursuant to Section 1600 et seq. of the Fish and Game Code. Issuance of SAAs is subject to the California Environmental Quality Act (CEQA). DFG, as a responsible agency under CEQA, will consider the CEQA document for the project. The CEQA document should fully identify the potential impacts to the stream or riparian resources and provide adequate avoidance, mitigation, monitoring and reporting commitments for completion of the agreement. To obtain information about the SAA notification process, please access the DFG website at www.dfg.ca.gov/1600; or to request a notification package, contact the Streambed Alteration Program at (707) 944-5520.

Questions regarding this letter and further coordination on this Project should be directed to Ms. Tami Schane at (415) 831-4640; or Greg Martinelli, Water Conservation Supervisor, at (707) 944-5570.

Sincerely,

Scott Wilson FOR
Charles Armor
Regional Manager
Bay Delta Region

cc: See Next Page

cc: Paul Amato
San Francisco Bay Region
California Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

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STATE OF CALIFORNIA

Arnold Schwarzenegger, *Governor*

PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298

September 13, 2007

Mike Coleman
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118-3614

RE: Alviso Slough Restoration Project, SCH# 2007082071

Dear Mr. Coleman:

As the state agency responsible for rail safety within California, we recommend that any development projects planned adjacent to or near the rail corridor in the County be planned with the safety of the rail corridor in mind. New developments/projects may affect pedestrian circulation patterns/destinations with respect to railroad right-of-way.

Safety factors to consider include, but not limited to, the planning for grade separations for major thoroughfares, improvements to existing at-grade highway-rail crossings due to the increase in pedestrian traffic volumes and appropriate fencing to limit the access of trespassers onto the railroad right-of-way.

Of specific concern is that the EIR investigate and discuss potential safety impacts from increased public access over or near the Union Pacific Railroad mainline located in the vicinity of the project site.

The above-mentioned safety improvements should be considered when approval is sought for the new development. Working with Commission staff early in the conceptual design phase will help improve the safety to pedestrians in the County.

If you have any questions in this matter, please call me at (415) 703-2795.

Very truly yours,

Kevin Boles
Environmental Specialist
Rail Crossings Engineering Section
Consumer Protection and Safety Division

cc: Terrel Anderson, Union Pacific Railroad

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TO: Michael Coleman, SCVWD
CC: Interested Parties
FR: Trish Mulvey
ON: September 14, 2007
RE: Alviso Slough Restoration Project NOP

Thanks for the opportunity to provide comments. If you have questions, you can reach me at (650) 326-0252, mulvey@ix.netcom.com, or 527 Rhodes Drive, Palo Alto, 94303.

I have the following questions or concerns about the proposed slough "restoration" ideas that I would like addressed in the EIR or presented to the Board of Directors for their consideration when the Project is presented to them:

1. What are the expected environmental impacts of increased boating in Alviso Slough? How can they best be minimized or mitigated?
2. What is the basis for the assumptions about sedimentation rates for alternatives that require dredging? And how do those assumptions compare with the assumptions being used in the South Bay Salt Pond Restoration Project? My concern is that assumptions for deposition rates which may be appropriate for relatively flat expanses of mudflats or salt ponds that are scoured by tidal action may be very different from deposition when essentially a "big hole" is created by dredging that might be expected to fill back to base elevation fairly rapidly.
3. What are the assumptions about changes in vegetation in Alviso Slough compared with changes in salinity that have occurred in since the federal Clean Water Act was adopted in 1972 – particularly changes that may be associated with low salinity effluent flows from the nearby San Jose/ Santa Clara Water Pollution Control Plant that have increased and changed with growth and development in the service area of the WPCP? What are the assumptions about Slough vegetation in the Project area that can be expected in the future with increased low salinity effluent discharges as growth in Silicon Valley continues?
4. Why is this Project being considered by SCVWD instead of Santa Clara County Parks and Recreation – perhaps as an adjunct to the County Alviso Marina project? Slough restoration for recreation and navigation seems more congruent with the purposed of the County than with the core function of SCVWD for flood damage reduction. (Also, in other locations like reservoirs, SCVWD seems to defer to the County for all aspects of providing recreational amenities.)
5. Why is the Project being considered now? What are the benefits of delaying consideration of the Project so it could be better synchronized with all aspects of the Salt Pond Restoration Project and the Corps of Engineers Shoreline Study?
6. How will the anticipated effects of global climate change on Bay water levels be considered for this Slough project (and for concomitant flood hazard reduction in Alviso)?
7. Given the constraints on funds for capital projects and ongoing operations and maintenance expenses that were highlighted in the May and June 2007 SCVWD budget discussions, why is SCVWD considering this project at this time? How will priorities be determined for a recreation and navigation enhancement project as compared with water supply infrastructure or flood protection projects?

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
777 Sonoma Ave., Room 325
Santa Rosa, CA 95404-4731

September 14, 2007

In response refer to:
SWR/F/SWR3:GS

Michael F. Coleman, AICP
Project Manager/Environmental Planner
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, California 95118

Dear Mr. Coleman:

Thank you for the opportunity to comment on the Notice of Preparation of a draft Environmental Impact Report for the Alviso Slough Restoration Project (Notice). The Santa Clara Valley Water District (SCVWD) is proposing the Alviso Slough Restoration Project (Project) to restore the slough's channel width to conditions found prior to 1983. The stated objectives for the project include: improve the community's ability to pursue navigation, public access, and aesthetics for boating and recreation; maintain one-percent flood protection; reduce mosquito nuisance; and promote integration with the South Bay Salt Ponds Restoration Project. NOAA's National Marine Fisheries Service (NMFS) has reviewed the August 7, 2007, Notice and offers the following comments:

(1) Listed Species and Anadromous Salmonids. Available information indicates that Alviso Slough provides important rearing and migration habitat for two anadromous salmonid species: Central California Coast (CCC) steelhead (*Oncorhynchus mykiss*) Distinct Population Segment (DPS) and Central Valley Fall-run Chinook Salmon (*O. tshawytscha*) Evolutionarily Significant Unit. CCC steelhead are listed as a threatened species under the federal Endangered Species Act (ESA) (January 5, 2006, 71 FR 834). In addition, North American green sturgeon southern DPS (*Acipenser medirostris*) occur in Alviso Slough, and this species is also listed as threatened under the ESA (April 7, 2006, 71 FR 17757).

(2) Essential Fish Habitat. Pursuant to the Magnuson Stevens Fishery Conservation and Management Act (MSA), the project is located within an area identified as Essential Fish Habitat (EFH) for various life stages of fish species managed with the following Fishery Management Plans (FMP):

Pacific Groundfish FMP - various rockfishes, flatfishes, sharks, *etc.*
Coastal Pelagics FMP - northern anchovy, Pacific sardine
Pacific Coast Salmon FMP - Chinook salmon

Under the Pacific Groundfish FMP, Alviso Slough is designated as a Habitat Area of Particular Concern (HAPC), because it is within the San Francisco Bay estuary. HAPC are described in the regulations as subsets of EFH that are rare, particularly susceptible to human-induced degradation, especially ecologically important, or located in an environmentally stressed area.

(3) Fish Habitat Impacts. Of the five project alternatives presented in the Notice, three alternatives consist of removal of vegetation/root mass in the channel and two consist of removal of vegetation/root mass combined with dredging. These actions will likely have significant impacts on fish habitat in Alviso Slough. Submerged and emergent vegetation provide important cover/shelter for fish, create low velocity refugia during storm runoff events, provide substrate for fish spawning, and provide substrate for invertebrates and other fish prey organisms. Removal of existing vegetation and root masses will significantly diminish the habitat value of Alviso Slough for native fish species. Dredging in estuarine habitats will also impact fish habitat through: (1) direct removal/burial of prey organisms, (2) turbidity/siltation effects, including light attenuation from turbidity, (3) contaminant release and uptake, including nutrients, metals, and organics, (4) release of oxygen consuming substances, (5) entrainment, (6) noise disturbances, and (7) alteration to hydrodynamic regimes and physical habitat.

(4) Flood Management Options. NMFS is concerned about the flood management options common to all five project alternatives. The Notice indicates all five alternatives include the lowering of the existing weir between the lower Guadalupe River and Pond A8. NMFS conducted an ESA section 7 consultation with the U.S. Army Corps of Engineers and the SCVWD for the Lower Guadalupe River Flood Protection Project (Lower Flood Project). For the Lower Flood Project, measures were developed to minimize the loss of threatened steelhead smolts and Chinook salmon smolts in flood events. Specifically, the existing weir at Pond A8 was designed to allow overflow from the Guadalupe River as infrequently as possible to minimize the loss of fish entrained into Pond A8. Pond A8 is a closed system and water quality is poor for anadromous salmonids. Juvenile salmon and steelhead entrained into Pond A8 during storm events are permanently lost. Thus, the weir at Pond A8 in the Lower Flood Project was designed to limit overtopping to a five-year or greater storm event. For the South Bay Salt Ponds Project, NMFS and the U.S. Fish and Wildlife Service have developed an operational schedule for the gated "notch" in the weir at Pond A8 which will provide for the "notch" to be closed during the smolt outmigration season. The Alviso Slough Project's proposal to lower this weir is inconsistent with the objectives of both the Lower Flood Project and the South Bay Salt Ponds Project at Pond A8.

(5) Project Purpose and Need. The purpose and need for the Project are not clear in the Notice. The Project's objectives include navigation, recreation, flood protection, mosquito nuisance reduction, and integration with the South Bay Salt Ponds Project. However, the Notice does not present information that these objectives are not currently being achieved in the project area. For example, in what manner is the community's use of Alviso Slough for navigation

and recreational access precluded under existing conditions. Why is there a need for further reduction of mosquito nuisance? Regarding flood protection, the SCVWD recently completed construction of the Lower Flood Project which provides for the conveyance of the 100-year storm flows through the project area.

(6) Integration With South Bay Salt Ponds Project. The South Bay Salt Ponds Project proposes to install a gated "notch" in the weir along the lower Guadalupe River in Alviso Slough to create tidal action in Pond A8. The increased tidal prism is anticipated to promote channel scour and enlarge the Alviso Slough channel. Thus, integration with the South Bay Salt Ponds Project may be best achieved by allowing the restoration of the tidal prism at Pond A8 to enlarge Alviso Slough instead of incurring the adverse environmental effects associated with vegetation removal and dredging.

In summary, NMFS believes the alternatives presented in the Notice are likely to result in significant environmental impacts to threatened CCC steelhead, threatened North American green sturgeon, fall-run Chinook salmon, EFH, and generally diminish the estuarine habitat value of Alviso Slough. The Project's purpose and need should be clarified and new alternatives developed to achieve project objectives in an environmentally sound manner.

If you have questions concerning these comments, please contact Mr. Gary Stern of my staff at 707-575-6060.

Sincerely,

Dick Butler
Santa Rosa Area Office Supervisor
Protected Resources Division

cc: Russ Strach, NMFS-Sacramento
Korie Schaeffer, EFH, NMFS, Santa Rosa
Tami Schane, CDFG-Yountville
Paul Amato, SFRWQCB-Oakland

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September 14, 2007

Fax # 408-979-5692
Michael F. Coleman, AICP
Project Manager/Environmental Planner
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118
Email: mcoleman@valleywater.org
Re: Alviso Slough Restoration Project, Draft EIR
Select Alternate #5

Dear Mr. Coleman,

Thank you for mailing me the Alviso Slough Restoration Project, Draft EIR Report. I understand it will cost the Santa Clara Valley Water District $13.5 Million dollars. I am also in agreement that this project needs to be restored back as it was in 1983, before the flood that devastated our lives in the Alviso Community. That is why I am selecting Alternative #5

Just some input, my husband and I moved here in 1962 and raised our 6 children here in Alviso. I remember the area of the Gold Street Bridge, S.B.Y.C. and marina was all opened water from one side to the other. We would take our children and walk the levees, appreciate the beautiful scenery, cool open breezes, clean air and sailing on water.

I want my tenants at 1611,1631,1671,1691 Archer Street and 1315 Michigan Avenue safe from flood control issues, plus restoration of the Alviso Slough. I want to see more tourists, boat owners, outsiders coming back to dock their boats for recreation purposes.

I have a question for you Mr. Coleman and would appreciate a written response. Near the Catherine and Hope Street Dock, which I understand the Santa Clara Valley Water District now owns it, as of 2006. There are boats and docks that block the navigational waterway of the slough. Will these be removed also and when?

Sincerely,

Juana Rivera

Juana Rivera
Lujan & Rivera Apts.
POB 43, 1313 Michigan Ave.
1611, 1631, 1671, 1691 Archer St. and 1315 Michigan Avenue
Alviso, CA 95002
408-263-9022

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September 13, 2007

Michael F. Coleman, AICP
Project Manager/Environmental Planner
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118
Email: mcoleman@valleywater.org
Re: Alviso Slough Restoration Project, Draft EIR
Choose Alternate #5

Dear Mr. Coleman,

I had the opportunity to attend your August 30 Scoping Meeting at George Mayne School Elementary cafeteria, and read all alternatives presented to me by the district, and have chosen Alternative #5. Even though it will cost $13.5 Million dollars to remove vegetation and dredge it like what Cargail Salt use to do in the past, this is our best option!

It has gone far too long that the Santa Clara Valley Water District has neglected Area G/Lower Guadalupe River/Alviso Slough Restoration Project maintenance. If the Water District would of just maintained it originally we wouldn't be going through this phase at all.

The whole purpose is Flood Control, Restoration, and Recreation. Not continued, Environmental and Social Injustice, Discrimination to the Alviso Community. "STOP" ignoring us!

Sincerely,
Ms Lurdes Rivera
POB 1111
Alviso, CA 95002
Alviso Water Task Force, Member
408-946-0979

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California Regional Water Quality Control Board
San Francisco Bay Region

Linda S. Adams
Secretary for
Environmental Protection

1515 Clay Street, Suite 1400, Oakland, California 94612
(510) 622-2300 • Fax (510) 622-2460
http://www.waterboards.ca.gov/sanfranciscobay

Arnold Schwarzenegger
Governor

Date: SEP 1 8 2007
File No. 2188.07 (PFA)

Mr. Michael Coleman
Project Manager
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

SUBJECT: Comments on the Notice of Preparation of a Draft Environmental Impact Report for the Santa Clara Valley Water District Alviso Slough Restoration Project, Town of Alviso, SCH# 2007082071

Dear Mr. Coleman:

San Francisco Bay Regional Water Quality Control Board (Water Board) staff has reviewed the Notice of Preparation (NOP) of a Draft Environmental Impact Report (DEIR) for the Santa Clara Valley Water District (District) Alviso Slough Restoration Project (Project). The District is considering five alternatives for further review that would remove between 2.6 to 25 acres of tidal wetland vegetation in order to restore Alviso Slough (Slough) to pre-1983 conditions. The following comments are provided to the District to clarify issues of concern to Water Board staff prior to development of the DEIR.

Related Projects

1. Page 2: States that the planned restoration of tidal exchange at Pond A8, as part of the South Bay Salt Pond Restoration Project (SBSP) "...could result in the restoration of a more natural process of tidal scour in Alviso Slough". Water Board staff suggest that the District further investigate the potential for increased tidal exchange at Pond A8 to meet Project objectives before pursuing actions that would have significant impacts on water quality and tidal wetland habitat. According to the Federal Clean Water Act Section 401(b) guidelines, projects must first avoid impacts, then minimize and mitigate for unavoidable impacts. The no action alternative, in view of the future Pond A8 breaching, would be an appropriate avoidance measure to protect water quality and beneficial uses in Alviso Slough.

2. Page 2: The NOP briefly describes how the tidal exchange from breaching Pond A8 could be unsustainable if increases in methyl mercury in the pond indicate that the levee should be restored. While this may be possible, there is currently no indication that increases in methyl mercury will occur as a result of breaching the levee, nor are there established thresholds to trigger a decision to restore the levee. Salt pond restoration in the South Bay, especially near Alviso Slough, will depend on careful coordination between all interested parties and sound science to inform how to address potential increases in methyl mercury. This is an evolving discussion that will benefit from ongoing monitoring of early implementation projects like breaching the levee at Pond A8.

3. Page 3: The NOP describes changes in the Slough and states that sedimentation and reduced channel width and depth "...precludes the community's use of the Slough for navigation and recreational uses". This suggests that navigation and recreation are no longer possible in Alviso Slough and appears to be an over statement.

4. Page 4: The project purpose is to restore the Slough to pre-1983 conditions, to create more open waters, enhance natural aesthetics, improve recreation access and restore historic uses of the Slough. Each purpose is addressed individually:

   a. **Restore Slough to pre-1983 conditions:** As stated, the Slough has changed over the past several years due to human influences on the local environment. The proposal to restore the Slough to pre-1983 conditions assumes that these conditions are better than current conditions. The DEIR should clarify this assumption and provide supporting, science-based information, including why achievement of Project purposes are worth the environmental impacts that would result.

   b. **Create more open waters:** Open water habitat has converted to tidal marsh, an important habitat along the margins of San Francisco Bay. Brackish marshes like found in Alviso Slough are described in Chapter 2, Section 2.2.3 of the San Francisco Bay Basin Plan (Basin Plan) as follows:

      "Another important characteristic of the Estuary is the fresh, brackish, and salt water marshes around the Bay's margins. These highly complex communities are recognized as vital components of the Bay system's ecology. Most marshes around the Bay have been destroyed through filling and development. The protection, preservation, and restoration of the remaining marsh communities are essential for maintaining the ecological integrity of the Estuary."

      Table 2-4 identifies general locations of wetlands around the Bay and designates their beneficial uses. Beneficial uses of South San Francisco, where Alviso Slough is located, include:

- Estuarine Habitat,
- Ocean, Commercial and Sport Fishing,
- Fish Migration,
- Preservation of Rare and Endangered Species,
- Water Contact Recreation,
- Noncontact Water Recreation,
- Fish Spawning,
- Wildlife Habitat,
- Salt Marsh Habitat

The DEIR should provide a science-based assessment of how the historic Slough conditions were supportive of beneficial uses, how this has changed, and why the proposed conditions of open waters should be restored.

c. **Enhance natural aesthetics:** This is a very subjective determination based on personal preference. One individual may prefer the appearance of open water while another prefers vegetated tidal marsh. Water Board staff do not consider "improved aesthetics" to be an appropriate project purpose in this case.

d. **Improve recreation access:** Water Board staff support recreation and access through recognizing water contact and noncontact water recreation beneficial uses in the Basin Plan. However, the other beneficial uses listed above also need to be considered in determining impacts of the Project. Currently, the San Francisco Bay Trail runs along the entire length of the east side of Alviso Slough from the UPRR Bridge to the confluence with South San Francisco Bay. According to the Bay Trail website, there are plans to connect to the Guadalupe River Trail and the San Tomas Aquino Trail. In addition, the proposed County Park Expansion Site project will provide additional boating access to the Slough, if it is approved. Therefore, the DEIR needs to clearly describe why additional recreation access is necessary and why impacts to water quality and beneficial uses are justified.

e. **Restore historic uses of the Slough:** The District should assess whether it is appropriate to incur direct and on-going maintenance impacts to existing wetlands that developed as conditions changed in the area surrounding Alviso Slough. Changes in hydrology, water quality, sediment supply and transport have altered much of South San Francisco Bay and resulted in existing conditions in Alviso. Vegetation removal and dredging will not restore the natural processes that maintained the Slough as it once was. The SBSP could result in the passive restoration of some or all of these conditions and the uses they allowed as described in the NOP and in comment number one of this letter.

5. Page 4: Five Project objectives are provided. Each one is addressed individually:

    a. **Restoring Alviso Slough width and habitat to prior-to-1983 conditions:** See items 4(a) and 4(b) above.
    b. **Improve navigation, public access, and aesthetics to increase boating, recreation and tourism:** See item 4(d) above.
    c. **Maintain 100 year flood protection:** On September 26, 2002, the Water Board approved Order No. R2-2002-0089 for the Santa Clara Valley Water District Lower Guadalupe River Flood Protection Project. This project was designed to provide flood protection along the lower reaches of the Guadalupe River and for the community of Alviso. It was completed in 2006. Components of the project included aggressive management of approximately 738 linear feet of wetland vegetation along the east side of the Slough and construction of an overflow weir into Salt Ponds A5, A6, A7, A8D, and A8W. According to the District's flood protection project application for water quality certification and waste discharge requirements, these activities resulted in approximately 2.34 acres of permanent and 3.07 acres of temporary wetland impacts in Reach G and in the Baylands reach adjacent to the community of Alviso. The DEIR should describe why additional impacts to water quality and beneficial uses are warranted shortly after completion of this flood protection project.
    d. **Reduce mosquito nuisance:** Water Board staff recognize the human health issues related to mosquito born illnesses and to this end work with local mosquito and vector control districts whenever necessary. However, because tidal wetlands are an important habitat the DEIR should clearly describe why there is a need to remove wetland vegetation in the Slough in order to control mosquito populations. A thorough assessment of the current mosquito nuisance problem and the projected positive impacts of removing wetland vegetation should be provided.
    e. **Promote integration with the SBSP:** Water Board staff appreciate the District's desire to promote integration with the SBSP but are not clear how the Project will accomplish this. The DEIR should clarify how the Project and the SBSP are integrated and whether it compliments or conflicts with the goals and objectives of the SBSP.

Project Alternatives

6. Pages 6 through 8: Five action alternatives are described with a range of impacts and activities. Some activities occur in one or more alternatives. Each activity is considered individually with emphasis on what should be assessed in the DEIR.

a. **Vegetation Removal:** The methods for vegetation removal include use of a mechanical rotovator with aquatic weed harvester, hand removal, and chemical treatment.
    i. **Rotovator:** Based on a September 2004, demonstration of the rotovator in the lower Guadalupe River upstream of the Gold Street Bridge, sediments are churned mechanically down to the rooting depth of vegetation, or approximately 3 to 4 feet, and the vegetation is collected and removed. At this location, it took one year for vegetation to return, suggesting that ongoing maintenance activities would be required to prevent vegetation from reestablishing in Alviso Slough.. The DEIR should describe impacts to water quality and beneficial uses due to increased turbidity, including how emulsification of sediments could result in continued scour and turbidity. The DEIR should also describe the potential for suspension of inorganic and methyl mercury and the potential for this to continue due to emulsification of sediments to a depth of 3 or 4 feet. Direct and ongoing maintenance related impacts to wetland habitat will also need to be considered.
    ii. **Hand Removal:** A description of hand removal activities and potential impacts to water quality and beneficial uses should be provided.
    iii. **Chemical Treatment:** The Project could result in the application of a significant amount of herbicides for both the initial removal and ongoing maintenance of vegetation. In order to be effective, most herbicide applicators will likely recommend the use of a surfactant with the herbicide. The District is currently approved to use specific aquatic herbicides and surfactants to maintain flood capacity and control invasive species under the Multi-Year Stream Maintenance Program (SMP). Best management practices (BMPs) are required, especially in streams that support salmonids. The DEIR should describe how the Project would be consistent with the SMP and what BMPs will be used to protect salmonids and other special status species in Alviso Slough.

b. **Dredging:** Alternatives 3 through 5 propose dredging to a depth of 8 feet to 16 feet to reduce the need for ongoing maintenance dredging and vegetation removal. The DEIR should describe how this activity will impact turbidity and suspension of inorganic and methyl mercury in Alviso Slough, lower Guadalupe River from tidal transport, and South San Francisco Bay. Sufficient sediment sampling will be needed to characterize both the contaminant levels in the dredged material and in the newly exposed, as-built channel bed. District staff would need to coordinate with Water Board staff on an appropriate sediment characterization plan.

c. **Habitat Loss:** The Project would result in removal of 2.6 to 25 acres of tidal wetland. The DEIR should describe populations of listed and unlisted species that use the Project area and clearly describe how the Project would avoid, minimize and mitigate any negative impact on these populations.

d. **Lowering Pond A8 Weir:** The DEIR should describe direct habitat impacts of this activity including potential for fish entrainment during high flow events.

e. **Abandoned Vessel Removal:** The NOP states that the Project will remove abandoned vessels and navigational hazards in the Project area. On January 11, 2006, the Bay Conservation and Development Commission provided written notification to the South Bay Yacht Club, located within the Project footprint, that they were required to remove seven abandoned and live-aboard vessels from Alviso Slough. The DEIR should clarify whether these vessels are still in Alviso Slough and whether these are the abandoned vessels that would be removed as part of the Project.

7. **Cumulative Impacts:** The DEIR should clearly describe how impacts from other nearby activities could exacerbate impacts from the Project. Careful consideration should be given to the Lower Guadalupe River Flood Project, the SBSP, County Park Improvement Project, and SMP sediment removal and vegetation management activities.

8. **Mitigation:** The DEIR should describe how the District would propose to avoid, minimize and then to mitigate for the removal of 2.6 to 25 acres of tidal wetlands. After avoidance and minimization of impacts have been fully exhausted, compensatory mitigation for similar projects includes in-kind habitat creation or restoration to a level that compensates for permanent and temporary impacts of project activities. Mitigation is typically located on-site or as close as possible to the impact area. Off-site mitigation may require additional compensation. This will need to be coordinated with Water Board staff.

Thank you for considering these comments in preparation of the DEIR. If you have any questions, please contact Paul Amato at (510) 622-2429, or via e-mail at pamato@waterboards.ca.gov.

Sincerely,

Shin-Roei Lee

Shin-Roei Lee, Chief
South Bay Watershed Division

cc: Ms. Holly Costa, Corps – Regulatory – San Francisco
Ms. Luisa Valiela, USEPA – Region 9 – San Francisco
Ms. Maura Eagan Moody, NOAA Fisheries, Santa Rosa
Mike Thomas, USFWS, Sacramento

CITY OF
SAN JOSE
CAPITAL OF SILICON VALLEY

Kansen Chu
COUNCILMEMBER

September 14, 2007

Michael F. Coleman, AICP
Project Manager/Environmental Planner
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Dear Mr. Coleman,

On behalf of my constituents in San Jose City Council District 4, which includes the community of Alviso, I am writing to express my support for the Alviso Slough Restoration Project. I commend the Santa Clara Valley Water District (SCVWD) for undertaking this important project that will eventually increase the channel width and improve the recreational opportunities in the Alviso Slough.

After careful deliberation of each five alternatives outlined in the Draft EIR, I urge you to consider Alternative #5 as the best choice for this project. The Alviso community strongly supports Alternative #5 and believes that this is the best option that will restore the Alviso Slough to its pre-1983 conditions.

My office is committed to working closely with Alviso Water Task Force (AWTF) members, and will continue this working partnership to ensure the members' voices are heard. Therefore, I am also extending my support for the AWTF's goals set forth by the members to increase flood protection, improve wildlife habitat for endangered species, and increase land recreation opportunities.

I encourage the SCVWD to continue collaborating with AWTF and consider the members' opinions and concerns as this project moves forward. It is pertinent that the SCVWD fulfills its duty to produce a quality project complemented by thorough planning.

Sincerely,

KANSEN CHU
Councilmember
City of San José

200 East Santa Clara Street, 18th Floor San José, CA 95113 *tel* (408) 535-4904 *fax* (408) 292-6459 kansen.chu@sanjoseca.gov

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CITY OF
SAN JOSE
CAPITAL OF SILICON VALLEY

Parks, Recreation and Neighborhood Services
COMMUNITY FACILITIES DEVELOPMENT

August 21, 2007

Mr. Michael F. Coleman
Project Manager / Environmental Planner
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

SUBJECT: Notice of Preparation of a Draft Environmental Impact Report
Alviso Slough Restoration Project

Dear Mr. Coleman,

Thank you for the notice regarding the subject project. Over the past several years, the City has completed master plans and studies related to future development of trail systems in the immediate area. I would like to ensure that the subject EIR accurately defines these future City trail projects and does not define a project that could prevent or substantially alter their development. The District should ensure that the following projects are noted in Section 3.0 of the EIR, entitled, "Related Projects". Additionally, our project alignments should be shown on maps presented as part of the EIR.

The following documents have been attached for your reference:

Lower Guadalupe River Trail Master Plan (adopted by the City Council in June 2005).
The plan defines a 6.4-mile trail system from Highway 880 to Gold Street. The trail would be constructed upon the north-easterly bank levee structure.

Bay Trail Master Plan (adopted by the City Council in June 2002)
The plan defines a 13-mile trail system with 1) a trail along the north-easterly bank from Gold Street to the Alviso Marina, 2) a trail along the perimeter of the Legacy Development site, using an existing maintenance road that follows the south-westerly bank.

Bay Trail Reach 9 Pedestrian Bridge Feasibility (March 2006) and Geotechnical (June 2007) studies
In order to ensure Bay Trail continuity near the Slough, the City will need to construct a 540' pedestrian bridge. The feasibility and geotechnical studies accurately define the placement of the structure in relationship to the slough and existing banks.

Should you require any additional information, please contact me at 793-5561.

Sincerely,

Yves Zsutty
Trail Program Manager

Attachment: CD

Copy: Brian Mendenhall, SCVWD
Jan Palajac, CSJ – CSJ-DPW
Patrycja Bossak, ABAG
Michael Rhoades, CSJ-PBCE
Janis Moore, CSJ-PBCE

County of Santa Clara
Parks and Recreation Department

298 Garden Hill Drive
Los Gatos, California 95032-7669
(408) 355-2200 FAX 355-2290
Reservations (408) 355-2201
www.parkhere.org

1850

September 11, 2007

Michael F. Coleman, AICP
Project Manager/Environmental Planner
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

SUBJECT: Comments to the Notice of Preparation of a Draft Environmental Impact Report (EIR) for the Alviso Slough Restoration Project

Dear Mr. Coleman,

The Santa Clara County Parks and Recreation Department (SCCPRD) has reviewed the Notice of Preparation of a Draft Environmental Impact Report (DEIR) for the Alviso Slough Restoration Project and submits the following comments for consideration in the EIR preparation.

The County Parks Department is focused on potential impacts resulting from the Alviso Slough Restoration project actions on Alviso Marina County Park which is located within the South Bay Salt Pond (SBSP) Alviso Pond complex. Since Alviso Marina County Park is located between SBSP Ponds A8 and A12 and adjacent to Alviso slough, our focus is directed to maintaining opportunities for recreation and public access and protecting the natural resources that support the Alviso Marina ecosystem. In addition, our intent is to ensure that the alternatives identified for the project are compatible with County parklands and recreational facilities, such as the regional trails.

Relationship to the Santa Clara County Countywide Trails Master Plan Update

The Land Use section of the EIR should acknowledge the policies and guidelines of the Santa Clara County Countywide Trails Master Plan Update *(Countywide Trails Master Plan)*, which the County Board of Supervisors approved in November 1995 as part of the Parks and Recreation Element of the County of Santa Clara General Plan (1995-2010). The Countywide Trails Master Plan identifies a regional trail route within the project area and adjacent to Alviso slough. Regional rail route R1-B, *Juan Bautista de Anza National Historic Trail*, lies along the east side levee of Alviso slough and connects to the San Francisco Bay National Wildlife Refuge trail system. This trail route is also part of the San Francisco Bay Trail and has been identified in the SBSP as recreational access site. The EIR should address this regional trail route given its location within the project site.

Board of Supervisors: Donald F. Gage, Blanca Alvarado, Pete McHugh, Ken Yeager, Liz Kniss
County Executive: Peter Kutras Jr.

- ***Relationship to Alviso Marina County Park***

The County Board of Supervisors approved the Alviso Marina County Park Master Plan in October 1997. This Board-approved master plan should be included in the EIR as a related recreation and public access plan. The SCCPRD is currently completing master plan improvements as noted in the NOP (section 3.0), including development of a new boat launch ramp. The Alviso Slough Restoration Project presents a concern to the SCCPRD as the project may have direct impacts, both positive and negative, on the development, operations and maintenance of the boat launch facility and other planned improvements in the park. As such, the EIR should evaluate impacts of the Alviso Restoration Project to the park and specifically to the boat launch facility.

SCCPRD appreciates and encourages ongoing efforts by SCVWD to integrate the planning process and share information as both projects move forward. However, given the proximity, and similarities in project schedules of both projects and potential effects the slough restoration project alternatives may have on the development of the boat launch facility, SCCPRD requests consultation as actions are planned in greater detail to ensure that the Department's ongoing master plan improvements to Alviso Marina County Park are minimally impacted by the slough restoration project

If you have any questions regarding these comments, please contact me at (408) 355-2235 or by email at Antoinette.Romeo@prk.sccgov.org. The Parks and Recreation Department would appreciate receiving a copy of the Draft EIR for comment when it becomes available. We appreciate the opportunity to review the NOP for the Draft EIR for the Alviso Slough Restoration Project and look forward to participating in future discussions regarding the development of the project.

Sincerely,

Antoinette Romeo

Antoinette Romeo
Park Planner

Cc: Jane Mark, Senior Planner, Santa Clara County Parks & Recreation Department
Mark Frederick, Construction Projects Manager; Santa Clara County Parks & Recreation Department
Ubaldo Perez, Associate Civil Engineer, Santa Clara County Parks & Recreation Department
Bal Ganjoo, Senior Project Manager, Capital Program Services Division, Santa Clara Valley Water District

From: "Mike Coleman" <MColeman@valleywater.org>
To: "Elke Rank" <Elke.Rank@edaw.com>, "Bal Ganjoo" <BGanjoo@valleywater.org>, "Katherine Oven" <KOven@valleywater.org>, "Doug Titus" <DTitus@valleywater.org>, "Javier Valencia" <JValencia@valleywater.org>
Date: 9/14/2007 11:24:16 AM
Subject: FW: Alviso Slough Restoration Project-----Comments from Tony Santos

Comments from Tony Santos

-----Original Message-----
From: tas48@sbcglobal.net [mailto:tas48@sbcglobal.net]
Sent: Friday, September 14, 2007 10:58 AM
To: Mike Coleman
Subject: Alviso Slough Restoration Project

After review of the many alternatives the Santa Clara County Water District has set forth for this project, I feel that Alternate # 5 is the best for the citizens of Alviso.

It meets all the criteria that the Alviso Water Task Force and the citizens of Alviso have asked for.

Thank You Tony A. Santos

CC: "Peggy Oman" <POman@valleywater.org>

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

September 12, 2007

Mr. Michael Coleman, AICP
Project Manager/Environmental Planner
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Subject: Notice of Preparation (NOP) for the draft Environmental Impact Report for the Alviso Slough Restoration Project

Dear Mr. Coleman:

I am writing in response to the (NOP) for the Draft Environmental Impact Report (EIR) for the Alviso Slough Restoration Project in Santa Clara County, California. We appreciate the attempts made by the Santa Clara Valley Water District (the District) to share information and coordinate amongst a vast array of stakeholders. We remain concerned, however, that several key issues have not been addressed prior to this NOP. We want to highlight the need for the EIR to address in sufficient detail, issues such as wetlands and water quality impacts from the proposed project.

Clean Water Act, Section 404

The NOP states the intent to submit an application to the U.S. Army Corps of Engineers (Corps) for a Clean Water Act, Section 404 permit. As the federal lead agency, the Corps will determine the appropriate environmental document under the National Environmental Policy Act that would need to be prepared. As part of the alternatives analysis, the applicant must demonstrate compliance with the Federal Guidelines (40 CFR 230) promulgated under the Section 404(b)(1) of the Clean Water Act (CWA).

Project Objectives

The proposed DEIR should provide detailed historical hydrogeomorphic information on the Alviso Slough area to help determine whether "prior-to-1983" conditions are preferable and feasible. It is appropriate that the proposed CEQA document consider alternatives in conjunction with the nearby South Bay Salt Pond Restoration Project. We would expect due consideration of the habitat changes expected to occur naturally to Alviso Slough if Pond A8 is restored to tidal influence as part of the No Action Alternative.

Hydrology, Water Quality, and Ecological Resources

Careful and detailed consideration must be presented in the proposed DEIR on the wetland and water quality impacts of the proposed activities, as well as the endangered species impacts. We look forward to a complete delineation of jurisdictional waters and full compliance with Federal Guidelines promulgated under CWA Section 404(b)(1).

Mercury

EPA supports the need for mercury and methylmercury monitoring in conjunction with any of the proposed alternatives and with activities related to Pond A-8.

If you have any questions or comments, or if we may be of assistance to you as you produce your environmental documents, please contact Luisa Valiela of my staff at 415-972-3400.

Sincerely,

David W. Smith, Chief
Wetlands Regulatory Office

cc: Molly Martindale, ACOE, San Francisco
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Appendix B

Water and Sediment Quality Background

Appendix B – Water and Sediment Quality Technical Appendix

REGULATORY AUTHORITIES AND ENABLING LEGISLATION

Federal and state agencies are authorized to ensure adequate surface water, sediment, and groundwater quality with respect to potential restoration impacts. The agencies, their enabling legislation, and their roles in establishing and implementing policies that should be considered in the evaluation of potential impacts to water quality are described below.

The United States Environmental Protection Agency (U.S. EPA) carries out the mandates set forth in the federal Clean Water Act (CWA). The CWA requires that waters of the United States (U.S.) be protected by adopting and implementing a program of water quality standards. Water quality standards consist of defined beneficial uses of water and numeric or narrative criteria[1] to protect those beneficial uses.

The U.S. EPA is authorized to delegate its authority to state agencies. In situations where a state fails to carry out the mandates of the CWA by enacting policies and regulations, the U.S. EPA is authorized to promulgate federal regulations that the state must abide by. This federal-state relationship is the basis for U.S. EPA's promulgation of the California Toxics Rule (CTR) in 2000, which established numeric criteria for toxic pollutants. U.S. EPA's promulgation authority is relevant to this analysis because of their lead role in revision of the California Toxics Rule selenium criteria. This revision is discussed below in the Emerging Water Quality Standards Programs section.

In California, the State Water Resources Control Board (SWRCB) is the lead agency with delegated authority to implement the CWA. The SWRCB's authority is enabled by California's Porter-Cologne Water Quality Control Act (Porter-Cologne). The SWRCB is responsible for implementing statewide water quality standards programs. One such program relevant to this analysis is the development and adoption of sediment quality objectives, which is discussed in the Emerging Water Quality Standards Programs section.

The SWRCB has delegated many duties enabled by Porter-Cologne to nine Regional Water Quality Control Boards (RWQCBs) that are defined by distinct hydrologic regions. Both the regional and project areas are within the jurisdiction of the San Francisco Bay Regional Water Quality Control Board (RWQCB). The San Francisco Bay RWQCB is responsible for developing water quality standards that are adopted in the Water Quality Control Plan for San Francisco Bay (the 2004 Basin Plan), following scientific and public review procedures set forth in Porter-Cologne sections 13240 - 13245. The Basin Plan lists beneficial uses of water and water quality objectives to protect those beneficial uses, which are described below in the Existing Water Quality Standards Programs section.

The Basin Plan also includes a plan of implementation that guides the San Francisco Bay RWQCB in carrying out its duties. Those duties include:

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[1] In California, water quality criteria are referred to as water quality objectives. The distinction between objectives and criteria is important, as federal criteria are viewed as guidelines to be considered, whereas state-adopted objectives have force of law. Because of the enforceability of state-adopted water quality objectives, the scientific, public, and legal review process is much more lengthy than for federal promulgation.

1. Issuing National Pollutant Discharge Elimination System (NPDES) permits as authorized by CWA section 402 to regulate discharges to navigable waters of the U.S. and their tributaries;

2. Issuing state Waste Discharge Requirements (WDRs) as authorized by Porter-Cologne Sections 13260 -13274 to regulate discharges to land and state waters not contiguous with Waters of the U.S.;

3. Issuing water quality certifications as authorized by CWA section 401 to projects with a Federal Component that may affect water quality, such as dredging and filling activities that require a CWA section 404 certification from the United States Army Corps of Engineers (USACE);

4. Issuing conditioned waivers of WDRs as authorized by Porter-Cologne 13269 for discharges and other activities that are not considered to threaten the beneficial uses of waters;

5. Requiring monitoring data from permitted dischargers as Authorized by Porter-Cologne Sections 13267 and 13225-c; and

6. Conducting enforcement as authorized by Porter-Cologne Sections 13300 – 13365 against parties who fail to apply for necessary permits or comply with existing permits and requirements.

The San Francisco Bay RWQCB also participates in many regional collaborative programs to monitor water quality and implement projects to protect and improve water quality. Examples of such collaborations include the San Francisco Bay Regional Monitoring Program (RMP), the San Francisco Bay Area Wetlands Regional Monitoring Program (WRMP), the San Francisco Bay Clean Estuary Partnership (CEP), and the SWRCB Surface Waters Ambient Monitoring Program (SWAMP).

The Santa Clara Valley Water District (District) is responsible for groundwater resources in the Project area. The agency carries out their mission by operating groundwater recharge facilities, conducting monitoring at guard wells, ensuring that unused wells are properly abandoned, and encouraging water conservation by municipalities in their service areas.

In addition to protecting water supplies, the District is also charged with flood protection and stream stewardship. The District flood protection mission is discussed in more detail in Section 3.1, Hydrology and Geomorphology. The District stream stewardship mission is carried out through all of its operations, including the Clean Safe Creeks and Natural Flood Protection Program. This program is funded through a 15-year voter approved benefits assessment that sunsets in 2016. The program is designed to protect property from flooding, ensure that streams and creeks are kept clean, protect and enhance the ecosystem function of streams, and provide open spaces, parks, and trails along streams and creeks in the Santa Clara Valley. Implementation of program elements would improve the quality of fresh water upstream of the Alviso Slough Restoration Project area.

The responsibility for protection of stormwater quality is assigned to the countywide Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP). SCVURPPP is a multi-agency program representing 14 municipal government co-permittees and the District. SCVURPPP implements a Stormwater Quality Management Plan (SQMP) with regulatory oversight from the San Francisco Bay

RWQCB. The SQMP describes a coordinated program of monitoring, watershed assessment, inspections, illicit discharge control, construction controls, municipal maintenance, and public education.

Two publicly-owned treatment works (POTWs) discharge highly treated water to shallow waters in the southern area of the regional setting. The San Jose Santa Clara Pollution Control Plant discharges to Artesian Slough and the Sunnyvale Water Pollution Control Plant discharges to Moffett Channel, which discharges to Guadalupe Slough. Both of these plants produce water treated to a sufficient quality to allow water recycling for irrigation and other uses. Each plant operates under a NPDES permit issued and enforced by the San Francisco Bay RWQCB. While there are no industrial dischargers in the regional setting, there are numerous ongoing cleanup operations in the region that extract groundwater, remove pollutants (primarily fuels and organic solvents), and discharge the treated groundwater under coverage by the NPDES general permit for groundwater discharge administered by the San Francisco Bay RWQCB. Periodic spills of toxic materials (e.g., brines, chemicals) in the region are subject to enforcement by the San Francisco Bay RWQCB.

The California Department of Toxics Substances Control (DTSC) regulates hazardous wastes. It derives its authority from Title 22 of the California Code of Regulations. Any areas known to have hazardous wastes in need of remediation near the project would be listed in the DTSC Envirostar database (http://www.envirostor.dtsc.ca.gov/public/). Land-based hazardous materials are discussed in Section 2.7 (Land-Based Hazardous Materials).

EXISTING WATER QUALITY STANDARDS PROGRAMS

As discussed above, the existing Water Quality Standards Program implemented by the San Francisco Bay RWQCB is defined in the Basin Plan. The Basin Plan lists numerous beneficial uses of water that apply in the project and regional setting. The most relevant beneficial uses include:

- Industrial service supply;
- Groundwater recharge;
- Contact and non-contact recreation;
- Freshwater fish habitat;
- Wildlife habitat;
- Migration of aquatic organisms;
- Spawning, reproduction, and/or early development of fish.
- Commercial Fisheries;
- Estuarine Habitat;
- Navigation;
- Preservation of rare and endangered species;
- Water contact recreation;
- Water non-contact recreation; and
- Shellfish harvesting.

Designated groundwater beneficial uses include municipal and domestic supply, agricultural supply, and industrial service supply.

To protect these beneficial uses, the Basin Plan lists both narrative and numeric water quality objectives for surface and groundwater. Narrative objectives provide general guidance to avoid adverse water quality impacts. Narrative objectives relevant to this analysis include salinity, sediment (i.e., total suspended solids [TSS]), sulfides, toxicity, biostimulatory substances, bioaccumulation, and population and community ecology. Those narrative objectives are listed in Table B-1.

Numeric water quality criteria included in the Basin Plan establish objectives for trace metals, dissolved oxygen, turbidity, temperature, pH, bacteriological pathogens, and un-ionized ammonia. In addition to the Basin Plan, the California Toxics Rule establishes another set of relevant water quality objectives for aquatic life and human health protection for approximately 130 priority trace metal and organic constituents. Wherever two objectives differ between the CTR and the Basin Plan, the more stringent objective applies. Numeric water quality objectives are summarized in Tables B-2, B-3, and B-4.

Applicable objectives are affected by both geography and salinity. Bay waters south of the Dumbarton Bridge are exempted from Basin Plan numeric objectives, although Basin Plan narrative objectives and California Toxics Rule numeric objectives still apply. The Basin Plan and the California Toxics Rule establish different numeric objectives for freshwater and saltwater. Freshwater is defined as having salinity < 1 parts per thousand (ppt) more than 95 percent of the time, whereas saltwater is defined as having salinity >10 ppt more than 95 percent of the time. Conditions between these two endpoints define estuarine waters, in which case the more stringent (lower) of either the freshwater or saltwater objectives apply.

There is guidance for the Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines (known as the Long-Term Management Strategy [LTMS] Guidelines) (SFRWQCB, 2000) which is incorporated by reference in the Basin Plan. The LTMS guidelines define statistically determined San Francisco Bay ambient sediment contaminant concentrations and ecological thresholds. These guidelines are listed in Table B-5. The ambient concentrations are established through previous sampling efforts around "unimpacted" areas of San Francisco Bay. The ecological thresholds defined in the guidelines are the Effects Range-Low (ER-L) and the Effects Range-Median (ER-M) established by the National Oceanic and Atmospheric Administration (NOAA). ER-Ls represent the concentration below which adverse biological effects are unlikely, while ER-Ms represent the concentrations above which adverse biological effects are likely. LTMS guidance is not a set of regulatory objectives.

In general, the San Francisco Bay RWQCB considers sediment with concentrations less than ambient levels to be acceptable for wetland cover material (the upper three feet), while sediment with concentrations less than ER-Ms are acceptable for wetland foundation material (greater than three feet below current or designed ground surface elevation). For PCBs, however, the ER-L is used as a guideline for cover material. For chlordanes and dieldrin, the values used for cover material are 0.0023 milligrams per kilogram (mg/kg) and 0.00072 mg/kg respectively. For some chemical constituents, the ambient value is greater than the respective ER-L. However, the San Francisco Bay RWQCB acknowledges that it is not practical to regulate to concentrations "cleaner" than ambient conditions.

Table B-1 Basin Plan Narrative Water Quality Objectives Relevant to this Analysis

Objective	Narrative
Salinity	Controllable water quality factors shall not increase the total dissolved solids or salinity of waters of the state so as to adversely affect beneficial uses, particularly fish migration and estuarine habitat.
Sediment	The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses. Controllable water quality factors shall not cause a detrimental increase in the concentrations of toxic pollutants in sediments or aquatic life.
Sulfides	All water shall be free from dissolved sulfide concentrations above natural background levels. Sulfide occurs in Bay muds as a result of bacterial action on organic matter in an anaerobic environment. Concentrations of only a few hundredths of a milligram per liter can cause a noticeable odor or be toxic to aquatic life. Violation of the sulfide objective will reflect violation of dissolved oxygen objectives as sulfides cannot exist to a significant degree in an oxygenated environment.
Toxicity	All waters shall be maintained free of toxic substances in concentrations that are lethal to or that produce other detrimental responses in aquatic organisms. Detrimental responses include, but are not limited to, decreased growth rate and decreased reproductive success of resident or indicator species. There shall be no acute toxicity in ambient waters. Acute toxicity is defined as a median of less than 90 percent survival, or less than 70 percent survival, 10 percent of the time, of test organisms in a 96-hour static or continuous flow test. There shall be no chronic toxicity in ambient waters. Chronic toxicity is a detrimental biological effect on growth rate, reproduction, fertilization success, larval development, population abundance, community composition, or any other relevant measure of the health of an organism, population, or community. Chronic toxicity generally results from exposures to pollutants exceeding 96 hours. However, chronic toxicity may also be detected through short-term exposure of critical life stages of organisms. As a minimum, compliance will be evaluated using the bioassay requirements contained in Chapter 4 [of the Basin Plan]. The health and life history characteristics of aquatic organisms in waters affected by controllable water quality factors shall not differ substantially from those for the same waters in areas unaffected by controllable water quality factors.
Floatables	Waters shall not contain floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect beneficial uses.
Settleable solids	Waters shall not contain substances in concentrations that result in the deposition of material that cause nuisance or adversely affect beneficial uses.
Oil and Grease	Waters shall not contain oils, greases, waxes, or other materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water, that cause nuisance, or that otherwise adversely affect beneficial uses.
Bioaccumulation	Many pollutants can accumulate on particles, in sediment, or bioaccumulate in fish and other aquatic organisms. Controllable water quality factors shall not cause a detrimental increase in concentrations of toxic substances found in bottom sediments or aquatic life. Effects on aquatic organisms, wildlife, and human health will be considered.
Turbidity	Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases from normal background light penetration or turbidity relatable to waste discharge shall not be greater than 10 percent in areas where natural turbidity is greater than 50 NTU.
Biostimulatory Substances	Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. Changes in chlorophyll-a and associated phytoplankton communities follow complex dynamics

Table B-1 Basin Plan Narrative Water Quality Objectives Relevant to this Analysis

<table>
<tr><th>Objective</th><th>Narrative</th></tr>
<tr><td></td><td>that are sometimes associated with a discharge of biostimulatory substances. Irregular and extreme levels of chlorophyll a or phytoplankton blooms may indicate exceedance of this objective and require investigation.</td></tr>
<tr><td>Population and Community Ecology</td><td>All waters shall be maintained free of toxic substances in concentrations that are lethal to or that produce significant alterations in population or community ecology or receiving water biota. In addition, the health and life history characteristics of aquatic organisms in waters affected by controllable water quality factors shall not differ substantially from those for the same waters in areas unaffected by controllable water quality factors.</td></tr>
<tr><td>Dissolved Oxygen</td><td>For all tidal waters, the following objectives shall apply:
In the Bay:
<table>
<tr><td>Downstream of Carquinez Bridge</td><td>5.0 mg/l minimum</td></tr>
<tr><td>Upstream of Carquinez Bridge</td><td>7.0 mg/l minimum</td></tr>
</table>
For nontidal waters, the following objectives shall apply:
Waters designated as:
<table>
<tr><td>Cold water habitat</td><td>7.0 mg/l minimum</td></tr>
<tr><td>Warm water habitat</td><td>5.0 mg/l minimum</td></tr>
</table>
The median dissolved oxygen concentration for any three consecutive months shall not be less than 80 percent of the dissolved oxygen content at saturation.
Dissolved oxygen is a general index of the state of the health of receiving waters. Although minimum concentrations of 5 mg/l and 7 mg/l are frequently used as objectives to protect fish life, higher concentrations are generally desirable to protect sensitive aquatic forms. In areas unaffected by waste discharges, a level of about 85 percent of oxygen saturation exists. A three-month median objective of 80 percent of oxygen saturation allows for some degradation from this level, but still requires a consistently high oxygen content in the receiving water.</td></tr>
<tr><td>Temperature</td><td>Temperature objectives for enclosed bays and estuaries are as specified in the "Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays of California," including any revisions to the plan.
In addition, the following temperature objectives apply to surface waters:
• The natural receiving water temperature of inland surface waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration in temperature does not adversely affect beneficial uses.
• The temperature of any cold or warm freshwater habitat shall not be increased by more than 5°F (2.8°C) above natural receiving water temperature</td></tr>
</table>

Table B-2 Current and proposed numeric water quality objectives for mercury in the regional setting and the project setting.

Current Total Mercury Water Quality Objectives in San Francisco Bay		
North of Dumbarton Bridge	0.025 ug/L 4-day average in water	Basin Plan
	2.1 µg/L 1-hour average in water	Basin Plan
South of Dumbarton Bridge	0.051 µg/L 30-day average in water	California Toxics Rule
Proposed total Mercury Water Quality Objectives **(As adopted by San Francisco Bay RWQCB and Approved by SWRCB, pending action by U.S. EPA)**		
All of San Francisco Bay	2.1 µg/L 1-hour average in water	Basin Plan
	0.2 mg/kg in larger fish which humans consume	Basin Plan
	0.03 mg/kg in smaller fish which wildlife consumes	Basin Plan
South of Dumbarton Bridge	0.051 µg/L 30-day average in water	South of the Dumbarton, this California Toxics Rule objective applies in addition to the three Basin Plan objectives.
Note: both the current and proposed Basin Plan objectives listed above are applicable in marine waters – those in which the salinity is equal to or greater than 10 parts per thousand 95 percent of the time. For waters in which the salinity is between fresh and marine, that is between 1 and 10 parts per thousand, the applicable objectives are the more stringent of the freshwater or marine objectives. For mercury, the marine objectives are more stringent.		

Table B-3 Basin Plan Surface Water Metals Criteria (µg/L)

	Water Quality Objective South of Dumbarton Bridge		**Water Quality Objective North of Dumbarton Bridge**	
	Continuous (4-day average)	**Maximum (1-hour average)**	**Continuous (4-day average)**	**Maximum (1-hour average)**
Arsenic	36	69	36	69
Cadmium	9.3	42	9.3	43
Chromium	50	1100	50	1100
Copper	6.9[g]	10.8[g]	3.1	4.8
Lead	8.1	210	8.1	210
Nickel	11.9[g]	62.4[g]	8.2[b]	74[b]
Selenium[f] (total recoverable)	5	20	5	20
Silver	-	1.9	-	1.9
Zinc	81	90	81	90

Table B-4 Other Basin Plan Surface Water Criteria

	Evaluation Criteria
Mercury	0.025[a] / 0.051[b] µg/L, but see Table 3.4-8 below
PCBs	30 ng/L[c]
PAH	15.0 µg/L[a,e]
PBDE	not regulated
DO	5 mg/L[a]
Dioxins and Furans	0.014 pg/L[f]
TPH – Diesel	200 mg/L[d]
Pesticides:	
Chlordanes	2.2 ng/L[b]
DDTs	0.59 ng/L[b]

[a] CRWQCB, SF Bay Region, Water Quality Control Plan, San Francisco Bay Basin Electronic Basin Plan, September 13, 2005. Surface waters greater than 10 ppt salinity.

[b] 40 CFR Part 131.38 (California Toxics Rule or CTR), May 18, 2000.

[c] CRWQCB, SF Bay Region, PCBs in San Francisco Bay, Total Maximum Daily Load Project Report.

[d] US EPA Multi-Sector Permit Benchmark Values.

[e] The water quality objective for PAHs is based on a 24-hr average.

[f] National Recommended Water Quality Criteria – Correction, U.S. EPA, April 1999.

[g] CRWQCB, SF Bay Region, Water Quality Control Plan Amendment, San Francisco Bay Basin.

Notes on Criteria:
Mercury = 0.051 ug/L is for waters south of the Dumbarton Bridge (California Toxics Rule).
0.025 ug/L is for waters north of the Dumbarton Bridge (Basin Plan)
PCBs = Value for protection of aquatic life and uses
Dioxins and Furans = water quality objective value for human health for consumption of organisms, 10^{-6} risk.
DO = water quality objective value for tidal waters downstream of Carquinez Bridge.
Pesticides = Several water quality criteria available. These are protection of human health for organism consumption, which are more conservative.
PAH = water quality objective value for 24hr averaged level, salinity over 10 ppt.

Table B-5 LTMS Sediment Guidance

Chemical Constituent	San Francisco Estuary Sediment Ambient Concentrations (mg/kg)	ER-L (mg/kg)	ER-M (mg/kg)
Metals			
Arsenic	15.3	8.2	70
Cadmium	0.33	1.2	9.60
Chromium	112	81	370
Copper	68.1	34	270
Lead	43.2	46.7	218
Mercury	0.43	0.15	0.71
Nickel	112	20.9	51.6
Selenium	0.64		
Silver	0.58	1	3.7
Zinc	158	150	410
Pesticides			
Aldrin	0.0011		
Dieldrin	0.00044	0.000715 [a]	0.0043 [b]
p,p'-DDD		0.00122 [a]	0.00781 [b]
p,p'-DDE		0.00220	0.027

EMERGING WATER QUALITY STANDARDS PROGRAMS

There are several emerging programs that will result in new, enforceable water quality and sediment quality objectives:

- The San Francisco Bay Mercury Total Maximum Daily Load (TMDL) was approved by SWRCB on July 17, 2007;
- The draft Basin Plan Amendments and supporting documents for the San Francisco Bay PCB TMDL were released for public comment on June 22, 2007. The Board heard public testimony on September 12, 2007, and an adoption hearing is anticipated in mid-January 2008. Following Board adoption, approval by the SWRCB and the U.S EPA is required;
- The Bay Protection and Toxic Cleanup Program Legislation of 1989, coupled to a Court Order in 2001, requires the SWRCB to adopt sediment quality objectives;
- The RWQCB has completed technical analysis necessary to adopt site specific objectives for copper and nickel North of the Dumbarton Bridge, and is considering amending the Basin Plan to reflect the new information developed;
- The U.S. EPA is working with an interagency technical team, including the SWRCB, USFWS, National Marine Fisheries Service (NMFS), and United States Geological Survey (USGS), to amend the selenium objective promulgated in the California Toxics Rule; and
- Trash could be listed as an impairing pollutant in many urban creeks, including the Guadalupe River and Coyote Creek during the lifetime of this Project. Measures to reduce trash will likely be implemented through the Municipal Regional Permit for stormwater; if these do not succeed, a trash TMDL is a potential next regulatory step. Pathogens could follow a similar trajectory.

New objectives resulting from these programs should also be considered with respect to evaluation of impacts. Details on these emerging programs (except for the trash and pathogens TMDLs) are provided below.

The San Francisco Bay Mercury TMDL

The San Francisco Bay mercury TMDL has adopted new water quality objectives for mercury concentrations in fish. Although water quality criteria and objectives are traditionally expressed as mass of pollutant per unit mass of water (e.g., micrograms per liter [μg/L]), the CWA enables expression of criteria and objectives in alternative units. For bioaccumulative pollutants such as mercury, recent guidance by U.S. EPA requires states to develop numeric criteria or objectives that are based on pollutant concentrations in fish tissue, and then implement the tissue-based criteria or objectives by translating the tissue-based values to water-based and sediment-based metrics. The fish tissue TMDL targets for the Bay mercury TMDL are 0.2 mg/kg for 60 centimeters (cm) striped bass, and 0.03 mg/kg for smaller fish (3 – 5 cm) that are the prey of wildlife. These objectives are summarized in Table B-2.

The San Francisco Bay Mercury TMDL establishes a monitoring endpoint (a.k.a. "TMDL monitoring target") for methylmercury concentrations in bird eggs. This monitoring endpoint is <0.5 mg/kg wet weight, which is the lowest observable effect level for impaired hatching success.

The San Francisco Bay Mercury TMDL also defines a numeric TMDL target of 0.2 mg/kg mercury, annual median, in suspended sediment for discharges to the Bay. Once this sediment target is met and

Bay sediments have reached equilibrium with these inputs, the average mercury in Bay sediments should be reduced by 50 percent from the current (2006) condition, and the water quality objectives in Table B-2 are expected to be obtained.

This does not translate directly to a 0.2 ppm guideline for sediments within or discharged from the Alviso Slough Restoration Project area. Rather, the evaluation of impacts will need to consider the potential of a project activity to raise or lower the average concentration of mercury in the Bay near where the activity takes place.

San Francisco Bay PCBs TMDL

As noted above, this TMDL recently entered the adoption phase, with a draft policy released in a public workshop held June 28, 2007. The proposed policy will include a sediment target based on fish tissue concentration that will be used to determine attainment of beneficial uses. If there are PCB-contaminated sediments in the ponds or depositional areas that are transported to the Bay as a result of project activities, this could delay recovery with respect to TMDL goals. Likewise, if PCBs are transported into the ponds via Bay sediments, this could cause cleaner pond sediments to be contaminated.

The Guadalupe River Watershed Mercury TMDL

The San Francisco Bay RWQCB completed a Guadalupe River Watershed Mercury TMDL Project Report in January 2006. This report provides the technical basis for future adoption of a TMDL for mercury in the Guadalupe River Watershed and the implementation strategy to achieve and support the TMDL. The Guadalupe River Watershed is a large source of mercury to South San Francisco Bay because of historic mercury mining in the upper watershed at the New Almaden Mining District, which was the fifth-largest mercury mine in the world. The TMDL Project Report proposes target fish concentrations for protection of wildlife and human consumers. These targets are achieved by setting allocations for the different mercury loadings to the Guadalupe River, including sediment concentrations and mass loadings from urban runoff, background soil, and atmospheric deposition. Development and implementation of a Guadalupe River Watershed Mercury TMDL seeks to address public concerns about contamination in the fish and waterways of the watershed as well as the broader goals of the 2004 San Francisco Bay Mercury TMDL.

SWRCB Sediment Quality Objectives

The SWRCB is developing sediment quality objectives based on the sediment quality triad approach. Chemical concentrations, bioassays, and benthic community condition are used together to establish the level of a constituent in sediment which provides for the reasonable protection of the beneficial uses of water and prevention of nuisances. The SWRCB also acknowledges the significance of bioaccumulation, but lacks the information or resources to develop detailed numeric sediment quality objectives for bioaccumulation. Rather, the SWRCB is committed to adopting narrative sediment quality objectives for bioaccumulation, and establish the process and data needs for deriving bioaccumulation-based sediment quality objectives on a regional basis. The SWRCB sediment quality objectives apply only to sub-tidal sediments.

U.S. EPA Revision of the CTR Selenium Objective

The U.S. EPA has "reserved" the CTR criterion for selenium pending consultation with wildlife resources agencies (USFWS and NMFS). These agencies are involved in an interagency technical team focused on revising the selenium water quality objectives for San Francisco Bay and the Sacramento-San Joaquin River Delta. It is expected that the resulting selenium objective will be based on fish-tissue concentration, similar to mercury, and the plan of implementation will specify procedures to translate tissue-based selenium concentrations to concentrations of the different chemical forms of selenium in water and sediments. The exact timing for completion of this process is unknown. For the Alviso Slough Restoration Project, the potential for selenium impacts should rely upon the CTR objective for selenium (5 µg/L), as well as tissue-based numeric endpoints that are derived from the national criterion (U.S. EPA, 2004), with appropriate conservative assumptions.

PHYSICAL SETTING

The physical setting with respect to water and sediment quality is organized around four major categories of pollutants. Bioaccumulative pollutants (mercury, PCBs, legacy organochlorine pesticides, and selenium) are discussed first because they are one of the most complex and important water quality factors that need to be considered for potential impacts. Conventional toxic pollutants are discussed next. The main emphasis for conventional toxics is trace metals, although a brief discussion of petroleum hydrocarbons is also included. Water quality parameters related to fisheries habitat (dissolved oxygen, temperature, salinity, and turbidity) are then described, followed by a summary of aesthetic-related water quality issues (trash, odors, phytoplankton and algae).

Bioaccumulative Pollutants

Pollutants that *bioaccumulate* tend to increase in concentration at each successive step in the food web. Relatively low concentrations of a bioaccumulative pollutant in water or sediment typically enter the base of the food web by accumulation in plants, algae, or bacteria. Grazers that feed at the base of the food web retain the pollutants while metabolizing the proteins and lipids of their food, magnifying the pollutant concentration. Predators and foragers that feed on the grazers further magnify the concentration of bioaccumulative pollutants. One issue of concern common to all bioaccumulative pollutants is the quality of food available to people and wildlife that use the Bay as a source of food. Another issue that is common to many, but not all, of the bioaccumulative pollutants considered is the possibility that deposits of contaminated sediments may be exposed and remobilized as a result of project alternatives considered. These issues are discussed by pollutant below.

In San Francisco Bay, the persistent bioaccumulative toxic (PBT) pollutants of primary concern are mercury, polychlorinated biphenyls (PCBs), legacy organochlorine pesticides (DDT, chlordane, dieldrin), selenium. These pollutants have different sources, fates, and effects that are summarized below. What they have in common, for the purpose of this analysis, is that the endpoint of concern is their concentrations in the food web.

Mercury, PCBs, and legacy organochlorine pesticides have in common the fact that risk is proportional to concentration in sediments. For this reason, the issues related to those PBTs are in the Regional setting and the Project area are discussed distinctly from selenium. A conceptual model relating PBT concentrations in sediments to accumulation in the food web is first presented. Then, known information about PBTs in the regional setting is summarized, followed by a discussion of recent assessments of PBTs in the Project area. The discussion of bioaccumulative pollutants concludes with an assessment of selenium in the regional setting and Project area.

Conceptual Model for PBT Impacts on Beneficial Uses

Detailed conceptual models for PBTs (mercury, PCBs, and organochlorine pesticides) have been developed by the San Francisco Bay CEP and have been relied upon to develop this report. They are pollutants of concern because they bioaccumulate in the food web, potentially affecting people and wildlife that eat fish and other protein sources from the Bay. The CEP conceptual models and impairment assessment reports summarize the current concentrations of PBTs in fish, the current spatial variation of the PBT concentrations in Bay sediments, and the current inventory of the PBTs in the upper layer of Bay sediments.

Common to all three PBT conceptual models is the pollutant concentration in sediments. The San Francisco Bay RWQCB is developing TMDLs for each of the PBTs analyzed in this memorandum. The TMDLs are all targeted at reducing the concentrations in fish that are important food sources for people and wildlife. Because of the complexity of processes that affect pollutant bioaccumulation, the TMDLs also use concentration in sediments as a basis for evaluating sources in need of amelioration and progress towards attainment of water quality standards. This is based on the simplifying assumption that the PBT concentration in fish is proportional to the bioavailable[2] PBT concentration in sediments. When site-specific information on the bioavailability is not available, the conservative assumption is made that all of the PBT is bioavailable.

This concept of bioavailability is more complicated for mercury. One specific form of mercury, methylmercury, is more prone to bioaccumulation than inorganic mercury. Most of the mercury in water and sediments tends to exist as inorganic mercury, rather than methylmercury. Conversion of inorganic mercury to methylmercury is mediated by bacteria. One of the factors that affects how much inorganic mercury is converted to methylmercury is the availability of inorganic mercury to the methylating bacteria. The availability of inorganic mercury depends on its chemical form. The form most available to methylating bacteria is operationally defined as "reactive" mercury. Reactive mercury is measured by assessing how much of the inorganic mercury present readily reacts with chemical reagents without any aggressive pre-treatment of the sample.

Measurement of reactive mercury is an indicator of how much mercury is available to methylating bacteria. Findings of the South Baylands Mercury Project are summarized in this memorandum on measurements of reactive mercury as a measure of the potential risk of increased methylmercury production. In the coming year, the South Baylands Mercury Project will also produce information on mercury in sentinel species that provides insights into the bioavailability of methylmercury and overall mercury accumulation in the food web. That information has not been compiled and reviewed yet, and is therefore beyond the scope of this memorandum. However, there has been sufficient preliminary coordination between the South Baylands Mercury Project team and the consultants for the Alviso Slough

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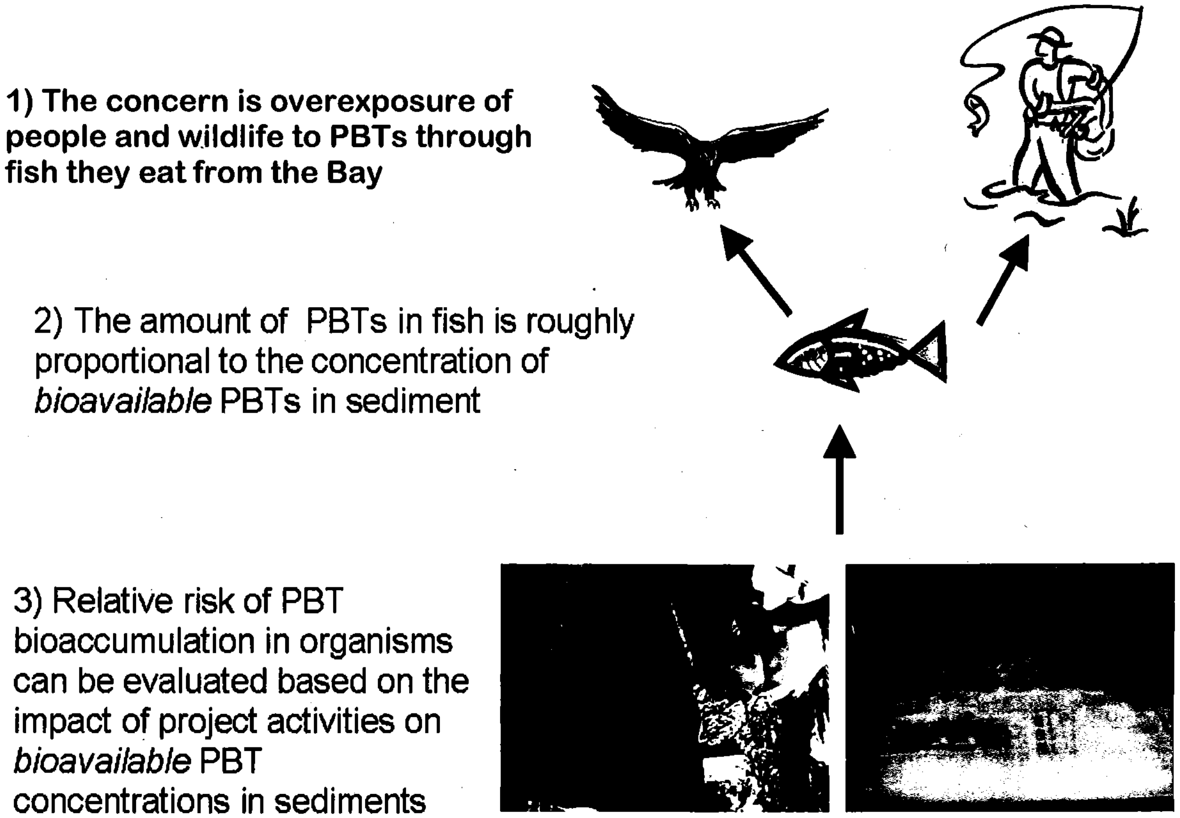
[2] Bioavailable means the fraction of the pollutant present that can be acquired by lower level organisms and transferred up the food chain by bioaccumulation. In some situations, not all of the PBT present in sediment is available for bioaccumulation.

Restoration Project to share an important general finding. The fraction of reactive mercury appears to depend on depth in the sediments. Therefore, regardless of the concentration of mercury in sediments at depth compared to the surface, one potential impact to be considered is increasing the fraction of reactive mercury in deep sediments by bringing them nearer to the surface.

Based on existing conceptual models (summarized in Figure B-1), the feasibility of implementing the project alternatives may be constrained by potential effects on the long-term concentrations of bioavailable PBTs in sediments of the Project area and the regional setting of Far South Bay. The simplifying assumption is made that most PBTs present are 100 percent bioavailable; therefore, the decisions about disposal of sediments must be based on PBT concentrations in sediments. The exception to this assumption is mercury, where project activities that would change the relative availability of mercury to methylation thereby increasing the overall bioavailability of mercury present, also need to be considered. The generalized conceptual model shown in Figure B-1 holds true for mercury, in that bioavailable mercury is the indicator of concern. However, in contrast to the other PBTs, mercury bioavailability in sediments can change by bringing buried sediments to the surface.


1) The concern is overexposure of people and wildlife to PBTs through fish they eat from the Bay
2) The amount of PBTs in fish is roughly proportional to the concentration of *bioavailable* PBTs in sediment
3) Relative risk of PBT bioaccumulation in organisms can be evaluated based on the impact of project activities on *bioavailable* PBT concentrations in sediments

Collecting sediment cores (left photo) and processing subsections (right photo) for PBT analysis

Figure B-1 Generalized Conceptual Model for PBT Effects on Beneficial Uses, Applicable to Mercury, PCBs, and Legacy Organochlorines

PBTs in the Regional Setting

Mercury and Methylmercury

Mercury is a potent developmental neurotoxin. It can affect the reproductive success of birds that forage the Bay and its margins for food. Concerns about human consumers are over the potential for impaired learning abilities and motor skills development in young children and the offspring of women who get a significant amount of their dietary protein from Bay fish. While there is presently no evidence of such effects in the Bay Area, risk guidance for mercury published by the U.S. EPA (2006) raises concern over the levels of mercury currently found in San Francisco Bay fish (SFEI, 2006).

The sources, transformation, and bioaccumulation processes of mercury relevant to the Project are extremely complex. Technical reports developed for the South Bay Salt Ponds (SBSP) Restoration Project present those processes in detail (Brown and Caldwell, 2004) (Brown and Caldwell, 2006). The key aspects of those reports are summarized below.

Mercury bioaccumulates mainly in the form of methylmercury, which is a mercury atom bonded to a carbon atom. Methylmercury is produced by the normal metabolic activity of bacteria, especially sulfate reducing bacteria that thrive under low oxygen conditions such as those found in wetlands and ponds adjacent to Alviso Slough. Different mercury sources may have greater or lesser propensities to be converted to methylmercury. Therefore, assessments of mercury risk have to account for the bioavailability of different mercury sources to the bacteria that convert mercury to methylmercury.

The San Francisco Bay Mercury TMDL includes requirements for all regulated sources of mercury to study and report on the bioavailability of mercury in their discharges. Some wastewater treatment plants, such as the San Jose Santa Clara Water Pollution Control Plant, have already started this kind of investigation. Other wastewater dischargers may wait upon the results of a national study which has recently been funded by the Water Environment Research Federation. The South Baylands Mercury Project has been undertaken by a partnership between the San Francisco Estuary Institute (SFEI), USGS and the District with the objective of characterizing baseline conditions for mercury in Pond A8, adjacent to Alviso Slough, and in the slough itself. Mercury bioavailability is being investigated by assessing total and reactive mercury in sediments, methylmercury in water and sediments, and mercury in sentinel species.

Sentinel species are smaller wildlife organisms (e.g., fish, clams, brine flies, birds) that are useful local indicators of dietary exposure to methylmercury. Sentinel species are important because of the complex factors affecting mercury transformation to methylmercury and subsequent bioaccumulation. To assess existing conditions and evaluate whether activities have environmental impacts, sentinel species are essential to provide an empirical observation of whether mercury is accumulating in the food chain to harmful levels.

The South Baylands Mercury Project has also collected sediment cores from Alviso Slough to investigate mercury concentrations in sediments that could be exposed as a result of dredging or vegetation removal. This is an important consideration, because historic releases of mercury from the New Almaden Mercury mines may have left a legacy of buried sediments with higher mercury concentrations that could be exposed and remobilized. The presence of older sediments with higher mercury concentrations is not certain, because the deposition and scouring cycles of Alviso Slough and the bayward channel are complex. Questions about legacy contamination of mercury in buried sediments are also applicable to other bioaccumulative pollutants, such as PCBs and organochlorine pesticides.

There are numerous other mercury studies planned, completed, and underway throughout the San Francisco Bay region. A useful compilation of current events can be found in the RMP's San Francisco Bay Mercury News, available at: http://www.sfei.org/rmp/mercury_newsletter/HgNews_home.html.

A conceptual model for mercury in San Francisco Bay has been developed that summarizes some of the most important processes affecting mercury in fish (Tetra Tech Inc., 2006). Much of the information in that conceptual model, along with other information, was also used to support the development of the San Francisco Bay Mercury TMDL (San Francisco Bay Regional Water Quality Control Board, 2004; San Francisco Bay Regional Water Quality Control Board, 2006). The following is a summary of the key features of mercury in the regional setting.

San Francisco Bay as a whole, including its adjacent baylands and sloughs, is listed as impaired by the State of California through the 303-d listing process due to mercury contamination in fish. This is because mercury concentrations in fish exceed risk assessment guidelines established by the U.S. EPA (Figure B-2). The Mercury TMDL for San Francisco Bay establishes 0.2 ppm as a water quality objective for mercury and is implementing a mercury reduction program to attain this objective.

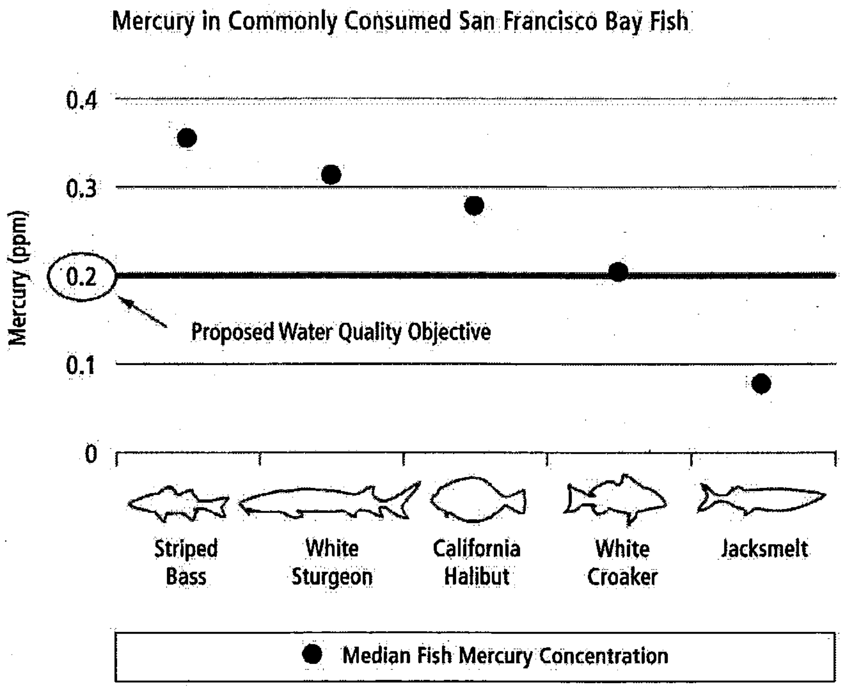


Figure B-2 Mercury Concentrations in Fish in the Regional Setting. Data from RMP 2003. Figure from (SFEI, 2006).

Sediments are an important storage and transport media for mercury in the Bay, because mercury has a strong tendency to bind to sediments rather than exist in the dissolved phase. For this reason, the Bay

Mercury TMDL also sets a target of reducing mercury concentrations in sediments by 50 percent from the current condition. The average mercury concentration in Bay sediments is approximately 0.4 ppm. This concentration increases to 0.5 – 1 ppm in the far South Bay as a result of historic releases from the New Almaden Mercury mines.

There are many sources of mercury to San Francisco Bay that have caused elevated mercury concentrations in Bay sediments. For reference, the pre-human mercury concentration in bay sediments was about 0.05 – 0.1 ppm, whereas the present day baywide average is about 0.4 ppm. Sources include mercury-contaminated sediments from mining impacted watersheds such as the Guadalupe River, which is downstream of the New Almaden Mercury mines, the largest historic mercury producer in North America. Urban runoff conveys mercury to the Bay from local sources such as improperly disposed fluorescent lights and other electronic devices, as well as mercury that deposits from the atmosphere. Mercury enters the atmosphere as a result of local and remote combustion-related sources, landfill gas emissions, and natural background emissions from volcanoes. Municipal treatment plants contribute a small but measurable amount of mercury, representing 1 percent or less of the total mercury loads entering the Bay.

As noted above, there are many complex factors affecting mercury accumulation in the food web. After reducing mercury sources to the maximum extent practicable, regional plans to reduce mercury concentrations in fish will need to take an adaptive management approach to reduce the production and bioaccumulation of methylmercury.

Adaptive management refers to a cyclic process where resource managers initiate management actions that make sense as a way of moving forward, and learn from the outcome to guide actions in subsequent phases (Johnson, 1999; Trulio and Clark, 2006). The SBSP Restoration Project is developing and implementing an adaptive management plan to handle some of the most complex resource management issues faced by the 50-year project (Trulio and Clark, 2006). The South Baylands Mercury study is one of the first adaptive management actions for mercury undertaken by the SBSP Restoration Project. It helps characterize the baseline of mercury conditions in Pond A8, adjacent to Alviso Slough, prior to initiation of Phase 1 actions that introduce Pond A8 to tidal inundation. This adaptive management process is described in greater detail in the environmental documentation available at www.southbayrestoration.org.

The SBSP Restoration Project is a significant component of the regional setting that affects mercury and other resource management issues faced by the Alviso Slough Restoration Project. For mercury, the key points related to the Regional Setting are:

- Mercury-contaminated sediments are known to exist in the regional setting as a result of historic discharges from the New Almaden Mercury mines, as well as atmospheric deposition and other sources.
- Mercury-contaminated sediments continue to discharge into the regional setting as a result of legacy contamination in the Guadalupe River Watershed (McKee et al., 2006). The discharge is episodic, occurring mostly during high-flow storm events. This input is expected to be reduced over time as a result of the Guadalupe River Mercury TMDL.
- While there are many factors that affect mercury methylation, low dissolved oxygen is known to increase production of methylmercury by promoting the growth of bacteria that convert mercury to methylmercury (Brown and Caldwell, 2004 and references cited therein).

- The structure of the food web plays an important role in bioaccumulation, so we can't reliably predict the risk of methylmercury bioaccumulation from methylmercury concentrations alone. Sentinel species are important to detect significant impacts to mercury accumulation in the food web.

These points are discussed in greater detail in technical support documents to the SBSP Restoration Project (Brown and Caldwell, 2004; Brown and Caldwell, 2006).

Polychlorinated Biphenyls

The knowledge base of PCBs sources, fate, and effects in San Francisco Bay is summarized in a conceptual model and impairment assessment report prepared for the Clean Estuary Partnership (Davis et al., 2006). The discussion below summarizes some of the key points of that report needed to understand PCBs in the regional setting and in the Project area.

PCBs are a class of man-made chemicals that were widely used from the 1930's until their production was banned effective 1979. There are 209 individual compounds, or "congeners" that are collectively referred to as PCBs. PCBs were used as industrial lubricants, in building materials, and in electrical transformers. Although new production in the U.S. was banned in 1979, the use of PCBs in completely closed electrical transformers remains legal to this day. The life expectancy of such transformers is decades; thus, hundreds of thousand of kilograms of PCBs remain in use in the Bay area. This inventory will gradually decline over time as old transformers are replaced. PCBs were also used as pump lubricants in natural gas transmission lines. Bleeding off of excess lubricant during periodic maintenance can lead to release of PCBs if the lubricant is not properly disposed. This has been a historic concern with the natural gas transfer station located near Coyote Creek in Milpitas, California.

PCBs are an environmental concern because they are potent carcinogens that are extremely persistent in the environment. They accumulate in the fats of organisms and are transferred up the food chain, increasing in concentration at each step. In contrast to mercury, where microbial transformations are the key to bioaccumulation, biochemical transformation of PCBs is not a necessary precursor to biomagnifications. Consequently, the conceptual model for management of PCBs in the Bay relies upon more direct food web models relating PCB concentrations in sediments to PCB concentrations in fish.

As with mercury, the fish tissue target for PCBs that has been proposed by the San Francisco Bay RWQCB for a Baywide TMDL is based on protecting people and wildlife that eat fish from the Bay. The resulting proposed risk-based target is 10 ng/g in fish. The corresponding sediment target proposed by the San Francisco Bay RWQCB is 1 ppb (i.e., 1 micrograms of PCBs per kilogram of sediment). These values should be kept in mind when considering PCB concentrations in sediments and fish in the regional setting and in the Project area.

PCBs in the Regional Setting

In the regional setting, PCB concentrations in fish tissue typically exceed the risk- based target of 10 ng/g (Figure B-3). This is why the Bay has been listed as impaired for PCBs by the San Francisco Bay RWQCB. In order to attain the proposed target in fish, PCB concentrations in the food web will need to be reduced by one to two orders of magnitude.

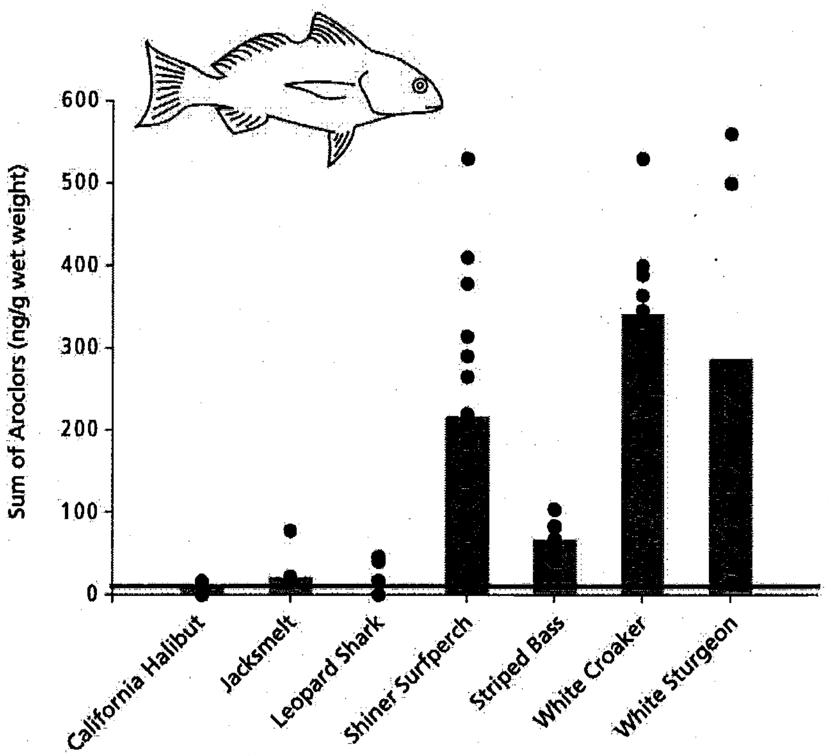


Figure B-3 **PCB Concentrations in Fish in the Regional Setting. Data from the RMP, Figure from (SFEI, 2006). Note that most Bay fish are well over the risk-based target of 10 ng/g.**

The spatial distribution of PCBs in the Bay is different from that of mercury. Mercury concentrations in sediments tend to increase towards the mouth of mining-impacted watersheds, such as the Guadalupe River. PCB concentrations in sediments tend to increase towards the shoreline of industrialized and urbanized margins of the Bay (Figure B-4). This results from the fact that these are areas where PCBs were historically used and released.

A recent study of sediment cores near storm drain outfalls (Applied Marine Sciences, 2004) shows that historic releases can also lead to elevated concentrations of PCBs in sediments in the margins of the Bay. PCB concentrations ranging from 50 to 1,000 parts per billion (ppb) were observed in sediment cores bayward of industrialized storm drains and flood control channels. Similar to mercury, this is an important issue to resolve in the Project area if project alternatives will remobilize deeper sediments.

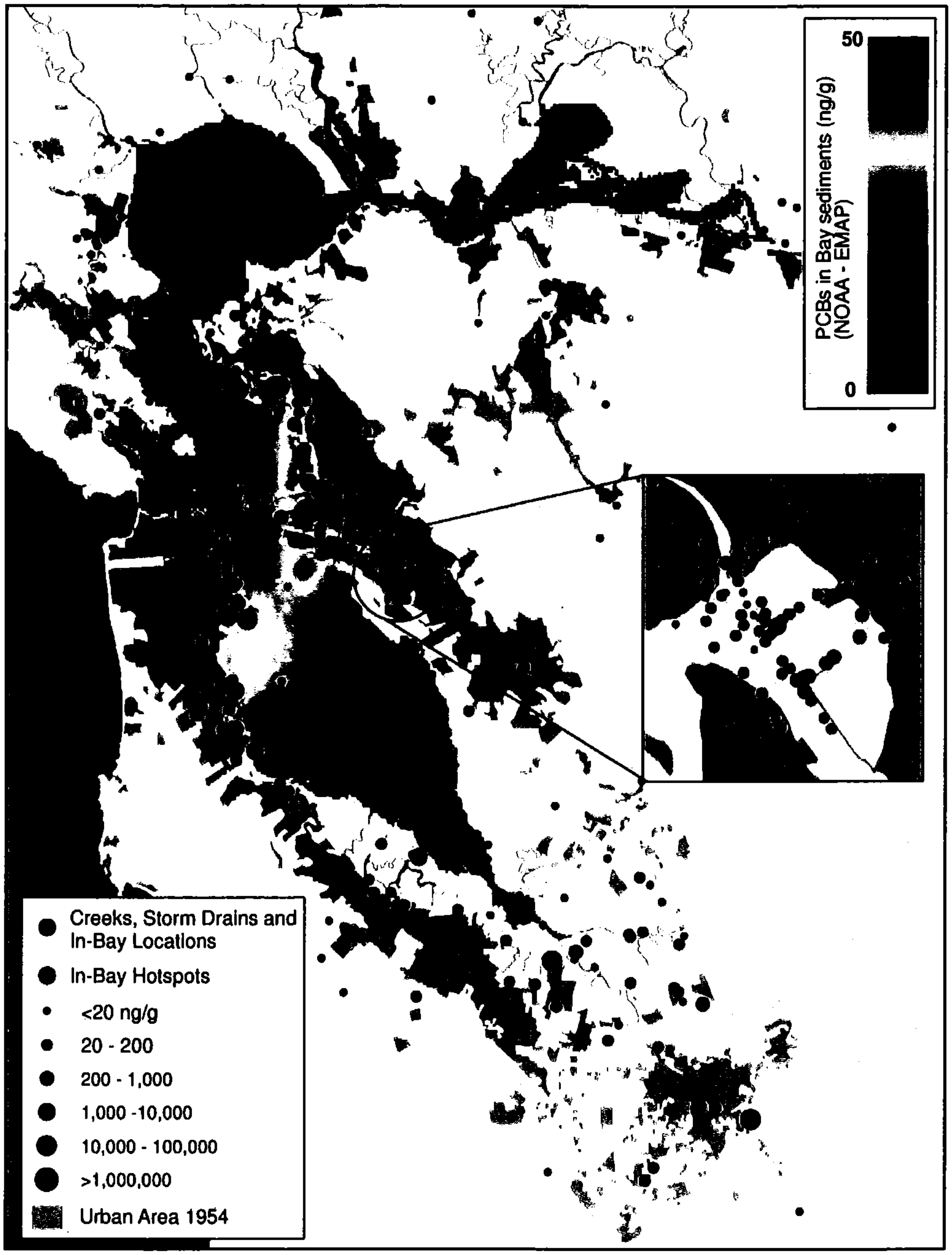


Figure B-4 PCB Concentrations in Bay sediments. Note that concentrations tend to increase towards industrialized and urbanized shorelines, and that most Bay sediments are well over the proposed target of 1 ppb. Figure from (SFEI, 2006).

The loads-based management strategy for PCBs in the Bay (Figure B-5) helps establish a framework for discussing potential impacts of remobilizing legacy contaminated sediments. The PCB conceptual model for the Bay integrates baywide sediment concentrations to calculate a baywide mass inventory of PCBs, i.e., the total mass of PCBs contained in the upper 10 to 15 cm of the Bay. Currently, there are approximately 2,500 kg of PCBs in the upper sediments of San Francisco Bay. Because PCB manufacturing has been banned and land-based cleanups have been initiated, this number is trending downward, though monitoring has not been conducted for long enough to know for certain the rate of decrease. There remains, however, a residual external load from contaminated lands, storm drains, flood control channels, and remobilization of buried sediments already in the Bay.

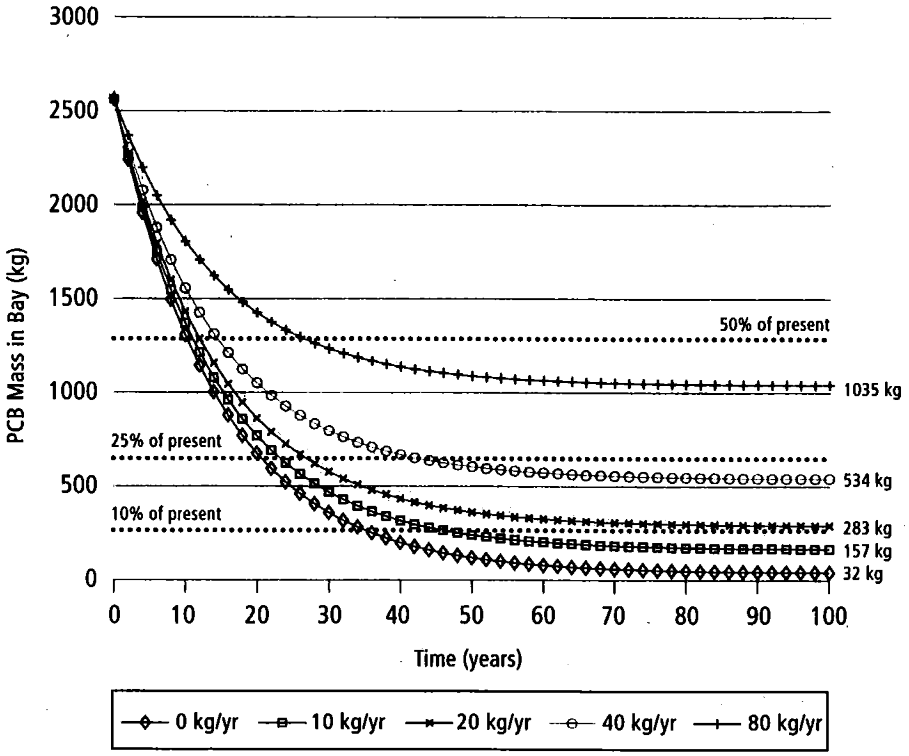


Figure B-5 **Recovery curve for PCB masses contained in the entire upper sediment layer of San Francisco Bay. The different curves show the rate of recovery and final masses under different load scenarios. Loading rates are assumed constant over the 100 year period. Figure from (SFEI, 2006).**

Box-model calculations help relate the reduction rate of the total mass of PCBs in the Bay over time to loading rates of PCBs from external sources and internal remobilization of buried sediments. Those calculations suggest that PCB loads from all sources would need to be reduced to about 10 kilogram (kg) per year to allow the Bay to attain an inventory that is 10 percent of the current level.

Legacy Organochlorine Pesticides in the Regional Setting

One important distinction between legacy organochlorines and PCBs is the degree of impairment. Unlike PCBs and mercury, impairment of wildlife is considered to be unlikely, so protection of human health is the primary driver for managing this class of compounds. Legacy organochlorines appear to be much closer to attainment of risk-based screening values compared to PCBs (Figure B-6). These screening values are established by the California Office of Environmental Health Hazard Assessment (OEHHA) and are based on assumptions about how much fish people eat on a daily basis. Because these compounds have been banned and the degree of impairment is less severe, TMDL development and resulting implementation strategies are proceeding on a less aggressive time scale.

Other Information Sources Considered to Describe the Regional Setting

Conceptual models developed by the CEP are the primary data sources relied upon to characterize ambient concentrations of PBTs in surface sediments of the Bay, The conceptual models considered in this section are Conner et al. (2004), Davis et al. (2006), and Tetra Tech (2006). Mercury concentrations in deep cores analyzed by Conaway are helpful to forecasting mercury concentrations in deeper sediments of the regional setting and the Project area. Those findings are published in Conaway et al. (2003), Conaway et al. (2004), and Conaway (2005).

A recent assessment of PCBs in sediment cores collected near storm water outfalls that drain industrialized areas provides a useful reference for predicting what might be found in deeper sediments of the Project area (Applied Marine Sciences, 2004). A recent statistical analysis of PCB concentrations in sediments of the near shore and open Bay helps compare the typical or expected concentrations of PCBs and the horizontal gradients expected in Bay sediments (Applied Marine Sciences, 2005). The USGS conducted a detailed analysis of sediment cores from San Francisco Bay that helps forecast PCB legacy pesticide concentrations in deeper sediments of the open Bay (Ventkatesan et al., 1999).

PBTs Near the Project Area

The South Baylands Mercury Project collected core samples to depths of six feet from transects on the marsh plain on either side of Alviso Slough, as well as from the center of the channel, downstream of the Project area. The locations of the cores analyzed are shown in Figure B-7. The cores were divided into subsections and analyzed for total mercury and reactive mercury to characterize risk due to mobilization of mercury-contaminated sediments. Mercury concentrations and chemical forms in core samples collected by the South Baylands Mercury Project are reported in a USGS Open File Report (Marvin-Dipasquale and Cox, 2007).

By coordinating with the South Baylands Mercury Project team, consultants for the Alviso Slough Restoration project were able to provide supplemental data on PCBs and legacy organochlorine pesticides in three of the cores shown in Figure B-8 (AS-T1A, AS-T1B, and AS-T1C). After several discussions with the South Baylands Mercury Project team and the District staff, the method of compositing the top and bottom halves of core was agreed upon as a cost-effective way to develop preliminary information as to whether a concentration gradient exists for PBTs. Top and bottom half composites were prepared from each of those cores and submitted for laboratory analysis. Composites were prepared by subsampling roughly equal masses (approximately 10 grams) of each subsection of a core, and recording the mass of subsample added to the composite. The analytical laboratories were required to homogenize composited samples prior to analysis.

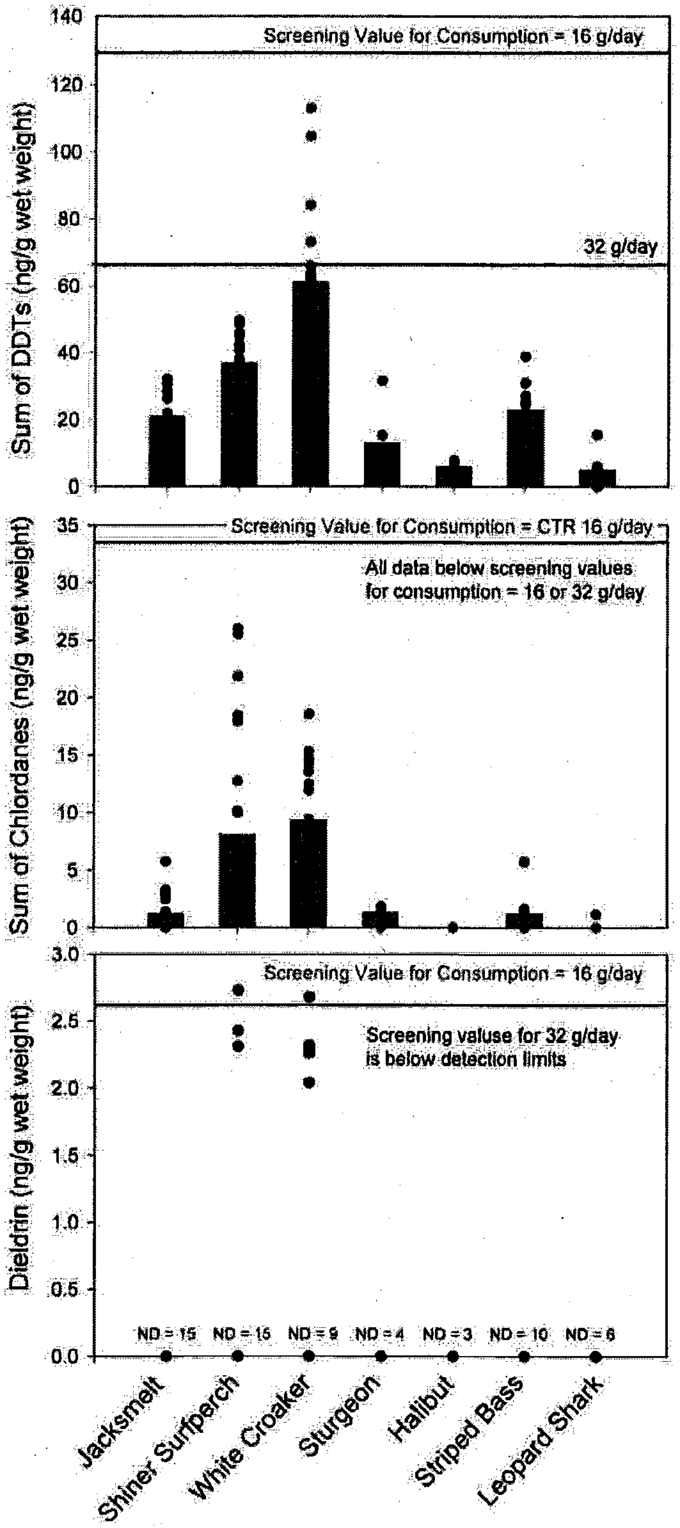


Figure B-6 DDT, Chlordane, and Dieldrin Concentrations in Bay Fish Compared to Screening Levels Established by OEHHA.

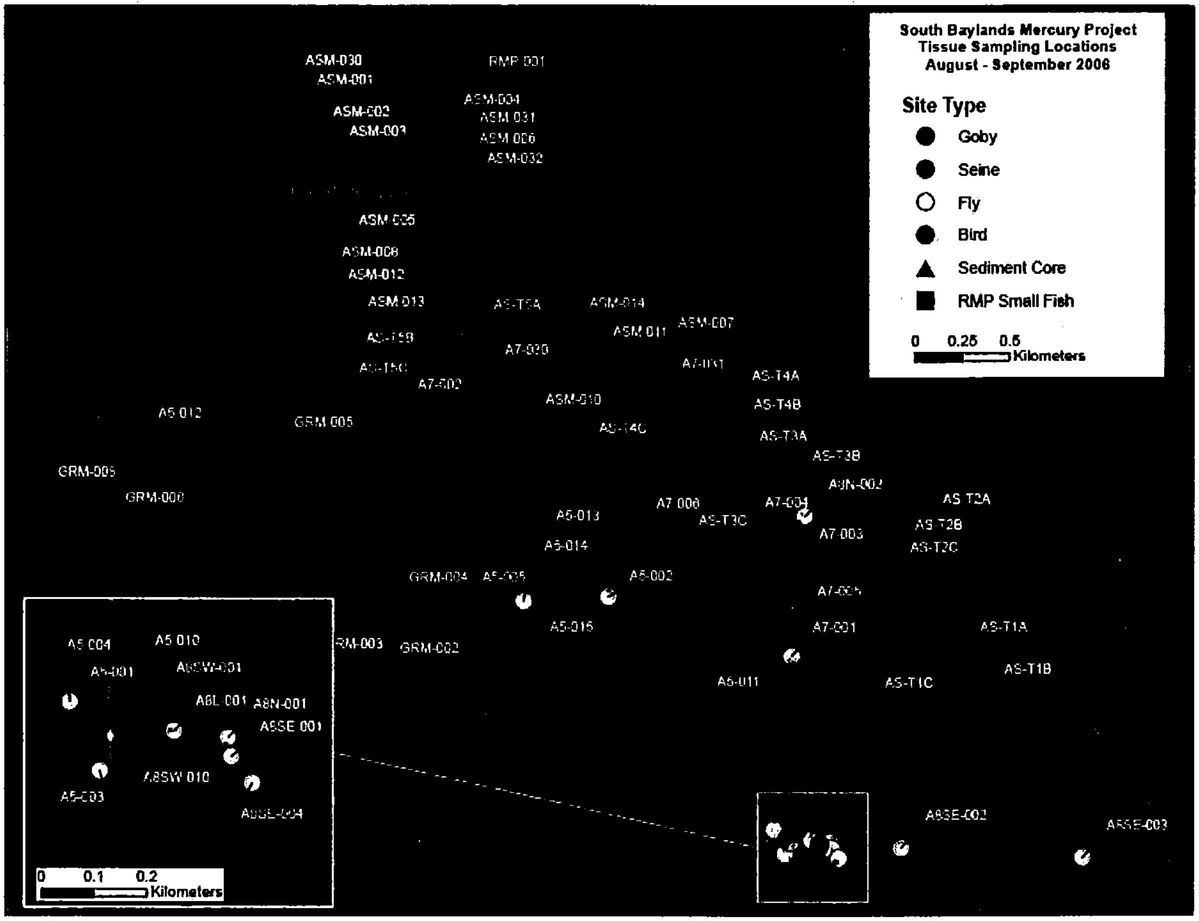


Figure B-7 Location of Samples Collected by the South Baylands Mercury Project. Triangles Indicate Core Sediment Samples Collected in September, 2006 Available for this Study.

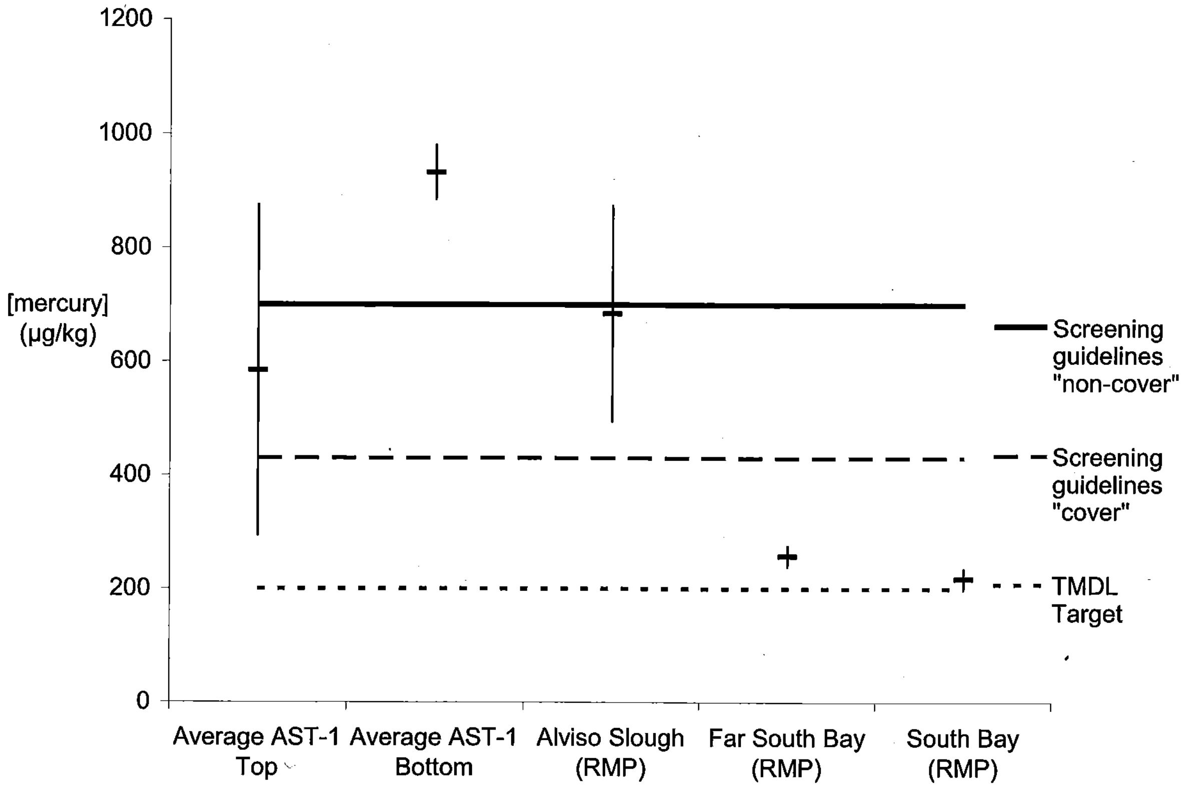


Figure B-8 **Concentrations (µg/kg) of the average total mercury concentration in the top halves and bottom halves of core composites from the South Baylands Mercury Study transect nearest the Project Area (AS-T1). Horizontal bars indicate the average of top half composites, standard deviations represent the 95% confidence interval. These are compared to the average and 95% confidence interval of sediment samples collected by the Regional Monitoring Program from Alviso Slough, Far South Bay, and South Bay. RMP data from www.sfei.org.**

The supplemental data for PCBs and legacy organochlorines are presented for the first time in this technical memorandum. The supplemental analysis plan to gather the PCB and organochlorine data was presented in a technical memorandum by Brown and Caldwell to the District in January 2007. The resulting data for PCBs and legacy organochlorine pesticides are presented below.

Summary of PBT Concentrations Near the Project Area

The results of the South Baylands Mercury project, along with other data sources cited in the Water and Sediment Quality Analysis Report, are used to predict likely concentrations of PBTs in the Project area. All of the cores collected by the South Baylands Project are approximately six feet deep. This is shallower than many of the dredging alternatives considered.

Mercury concentrations in the cores collected from the South Baylands Mercury Project ranged from 80 to 2,830 micrograms per kilogram (µg/kg), with a median of 800 µg/kg. Mercury concentrations in the sediment cores AS-T1A, AS-T1B, and AS-T1C ranged from 470 to 1,420 µg/kg, with a median of 740 µg/kg. One of the key findings of the study was that there was not a statistically significant variation in the total mercury concentration over the vertical depths of the cores. Another important finding was that the relative amount of reactive mercury is much higher near the top few inches of the surface (around 10 percent) compared to reactive mercury at depth (around 1 percent) (Marvin-Dipasquale and Cox, 2007).

In terms of potential mercury impacts, the issue of concern does not appear to be remobilization of deeper sediments that are more contaminated with mercury compared to the surface. Rather, the issue to consider is the possibility that deepening Alviso Slough will increase the amount of reactive mercury in deeper sediments, potentially causing a transient or longer-term "spike" in the production of methylmercury.

The concentrations of mercury, PCBs and legacy organochlorines in sediments found in the transect closest to the Project area are summarized in Table B-6 below. For comparison of the organochlorine and PCB data to the mercury data, the mercury concentrations in subsections reported by Marvin-Dipasqualue and Cox (2007) were composited by calculating their weight-averaged concentrations in top halves and bottom halves based on the subsampling record used to prepare composites for PCB analysis. Details of the vertical distributions of these compounds are discussed below.

Mercury Concentrations Near the Project Area

Mercury concentrations in top and bottom half composites are shown in Figure B-8. These are compared to concentrations found in Alviso Slough, Far South Bay (South of the Dumbarton Bridge), and South Bay (North of the Dumbarton Bridge). Guidelines established for the placement of material in the foundation of wetlands (non-cover) and as wetland cover material are also shown. The Regional Board's TMDL target for mercury in sediments is to attain a 50 percent reduction in the overall mass of mercury in the upper layer of Bay sediments, which would correspond to a mercury concentration of 200 µg/kg.

Table B-6 PBT Concentrations in the Transect Nearest the Project Area (AS-T1). Averages and standard deviations shown are for the top half and bottom half composites of Cores A, B, and C. All values shown are in µg/kg (parts per billion).

Contaminant	Top half of cores A, B, and C	Bottom half of cores A, B, and C	Screening guideline for wetland foundation material ("non-cover")	Screening guideline for wetland surface material ("cover")	TMDL Target
Mercury	585 ± 292	933 ± 49	700	430	200
PCBs	52 ± 17	173 ± 17	180	22	1
DDTs (sum of)	27 ± 5	48 ± 16	46	7.0	NA
Chlordanes (sum of)	3.7 ± 2.3.	16 ± 9	4.8	2.3	NA
Dieldrin	ND (<0.05)	2.0 ± 0.2 in bottom half.	4.3	0.71	NA

Key points about mercury in sediment core composites that emerge from Figure B-8 are:

- The average of bottom half mercury concentrations from transect AS-T1 is higher than the top half, although the difference is not statistically significant at the 95 percent confidence level.
- Average mercury concentrations of top and bottom half composites exceed the guideline for use as wetland cover material; the exeedance is statistically significant at the 95 percent confidence level for the bottom half composite.
- The average mercury concentration of the bottom half composite also exceeds the non-cover guideline for placement of sediments in wetland foundations (non-cover) by a statistically significant amount.
- Mercury concentrations in the top half core composites are comparable to mercury concentrations in surface sediments of Alviso Slough measured by the RMP.
- Mercury concentrations in Alviso Slough surface sediments are three to four-fold higher than in Far South Bay or South Bay
- Mercury concentrations in Alviso Slough exceed the mercury TMDL's long-term goal of 200 µg/kg by approximately three to five-fold.

PCB Concentrations Near the Project Area

For regional context, the spatial average and variability of the top and bottom halves of cores can be compared to surface sediments from San Francisco Bay and cores collected from areas near known upland releases of PCBs. This information is shown in Figure B-9, along with sediment cover and non-cover guidelines and the Regional Board's proposed target for the average concentration of PCBs in Bay sediments.

Key points about PCBs that emerge from Figure B-9 are:

- The average and standard deviation of top halves and the average of bottom halves from the single transect gives the spatial variability across that transect.
- In contrast to mercury, the difference between average top half PCB concentrations and average bottom half PCB concentrations is significant ($P > 0.95$, t-test) compared to the spatial variability.
- The levels of PCBs in both top and bottom halves exceed the guidelines for placement of sediments in wetland surfaces as cover by a statistically significant amount.
- PCB levels in the bottom halves come close to exceeding the guidelines for placement of sediments in wetland foundations (non-cover); PCB levels in the top halves are well below this "non-cover" guideline.
- Similar to mercury, PCB concentrations in the top halves are comparable to PCB concentrations found in surface sediment of the near shore environment of San Francisco Bay.
- PCB concentrations in the bottom halves of sediment core composites are comparable to concentrations found in sediment cores collected in the Bay margins downstream of PCB-contaminated industrial drainages.
- PCB concentrations in bottom halves of cores are 173 times higher than the proposed TMDL target of 1 µg/kg. This is a substantially higher margin than the amount that mercury concentrations exceed the mercury TMDL target (See above).

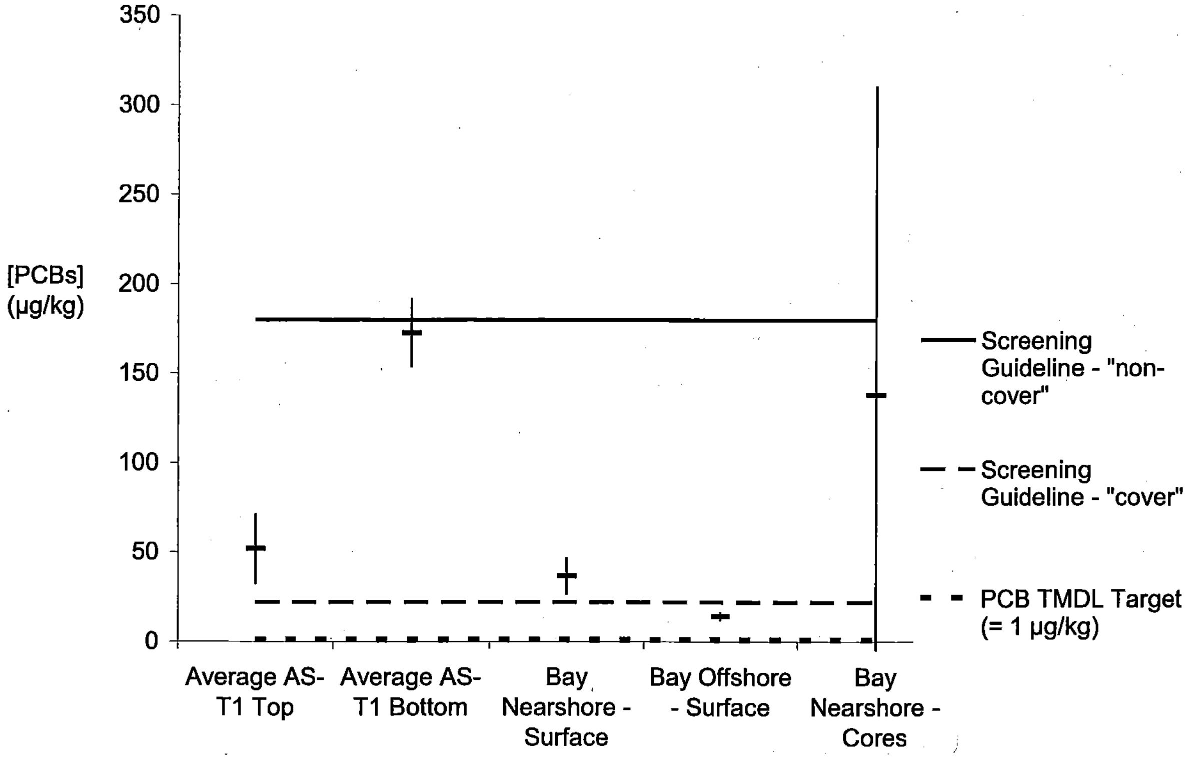


Figure B-9 **Concentrations (µg/kg) of the Average Sum of PCB Congeners Measured in the Top Halves and Bottom Halves of Sediment Core Composites Collected by the South Baylands Mercury Study. Horizontal bars represent the average, vertical bars represent the 95% confidence interval. These are compared to the mean and 95% confidence interval for surface sediments in the near shore and offshore environment of San Francisco Bay (Applied Marine Sciences, 2004), and sediment cores collected downstream of storm drains known to be contaminated by PCBs (Applied Marine Sciences, 2005).**

Organochlorine Pesticide Concentrations Near the Project Area

For legacy organochlorine pesticides such as DDT, chlordane, and dieldrin, there are no TMDL targets for comparison. The best available regional data from CEP conceptual models cited reports the average and 90th percentiles of typical Bay conditions, which are shown for regional comparison in Figures B-10 through B-12, below. Total DDT concentrations are summarized in FigureB-10.

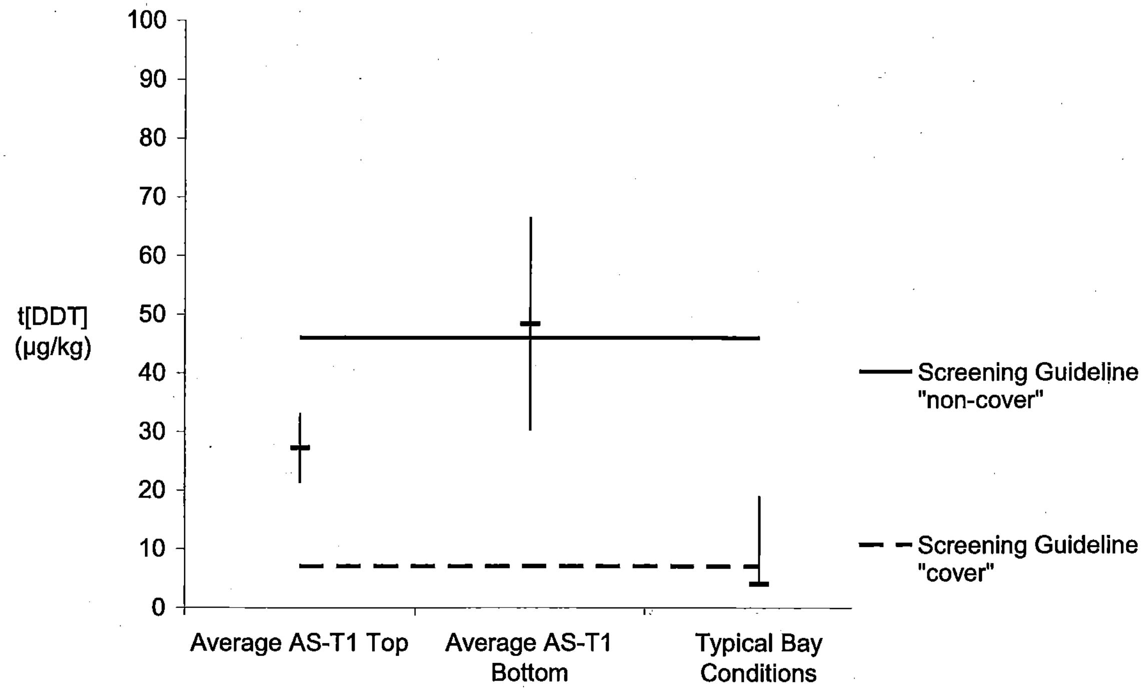


Figure B-10 **Total DDT Concentrations Measured in the Top Halves and Bottom Halves of Sediment Core Composites Collected by the South Baylands Mercury Study. Horizontal bars represent the average, vertical bars represent the 95% confidence interval. The typical Bay condition is indicated by the 90th percentile of total DDT concentrations in surficial Bay sediments as summarized by Conner et al (2004).**

Key points about DDT that emerge from Figure B-10 are:

- Top and bottom half composite results for DDT exceed the screening guideline for placement in a wetland surface as cover.
- The DDT concentration in the bottom half also exceeds the guideline for placement in wetland foundation (non-cover), although the exceedance is within the uncertainty driven by spatial variations.
- Top and bottom half composite results for DDT are higher than typical, ambient conditions found in surface sediments of the Bay.
- Similar to mercury, the observed difference between the DDT concentrations of top halves and bottom halves is not statistically significant at the 95 percent confidence level compared to the spatial variability.

Total chlordane concentrations are summarized in Figure B-11.

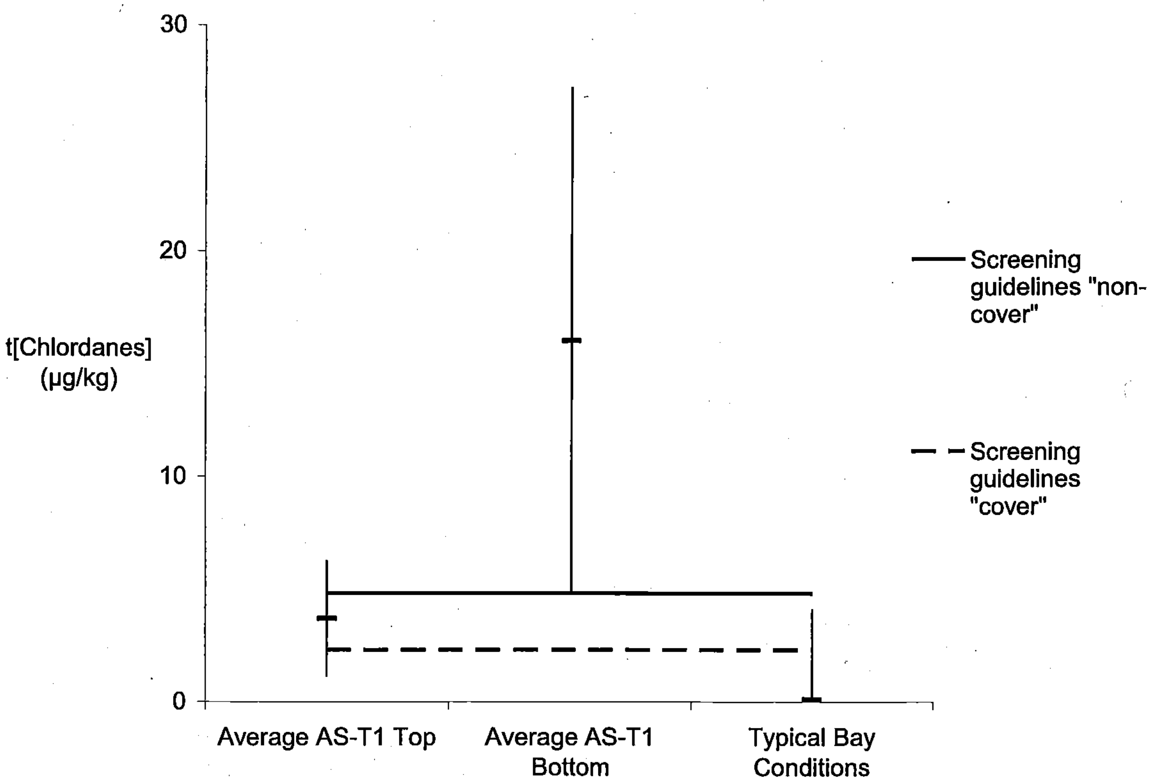


Figure B-11 **Total Chlordane Concentrations Measured in the Top Halves and Bottom Halves of Sediment Core Composites Collected by the South Baylands Mercury Study. Horizontal bars represent the average, vertical bars represent the 95% confidence interval. The typical Bay condition is indicated by the 90th percentile of total chlordane concentrations in surficial Bay sediments as summarized by Conner et al (2004).**

Key points about total chlordane that emerge from Figure B-11 are:

- Similar to DDT, the top and bottom half composites for chlordane exceed the screening guidelines for placement in a wetland surface as cover, although the exceedance is not statistically significant at the 95 percent confidence level in the top halves;
- The average chlordane concentration in the bottom halves also exceeds the chlordane guideline for placement in wetland foundation (non-cover), and in contrast to DDT, the exceedance is significant compared to the uncertainty driven by spatial variations; and
- Similar to DDT and mercury, the observed difference between the chlordane concentrations of top halves and bottom halves is not statistically significant at the 95 percent confidence level compared to the spatial variability.
- Similar to mercury, and in contrast to DDT, the amount by which chlordane concentrations in the bottom half exceed the wetland non-cover guidelines is statistically significant at the 95 percent confidence level.
- Similar to DDT, the top and bottom half composites for chlordane are higher than typical, ambient conditions found in surface sediments of the Bay.

Dieldrin concentrations are summarized in Figure B-12.

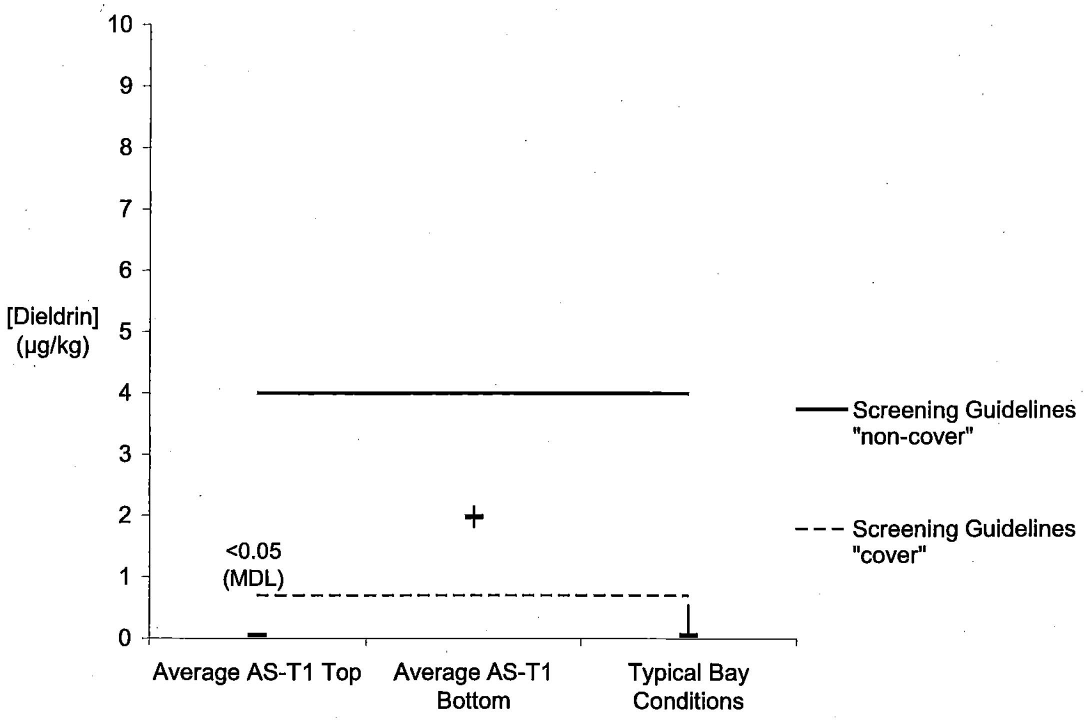


Figure B-12 **Dieldrin Concentrations Measured in the Top Halves and Bottom Halves of Sediment Core Composites Collected by the South Baylands Mercury Study. Horizontal bars represent the average, vertical bars represent the 95% confidence interval. The typical Bay condition is indicated by the 90th percentile of dieldrin concentrations in surficial Bay sediments as summarized by Conner et al (2004).**

Key points about dieldrin that emerge from Figure B-12 are:

- Unlike mercury, PCBs, DDT and chlordanes, only the bottom half composite for dieldrin exceeds the screening guideline for dieldrin for placement in a wetland surface as cover;
- Unlike mercury, PCBs, DDT and chlordanes, neither the top nor the bottom half dieldrin result exceeds the guideline for placement in wetland foundation (non-cover).
- Unlike mercury, DDT and chlordanes, only the bottom half composites for dieldrin are higher than typical, ambient conditions found in surface sediments of the Bay.
- Differences between dieldrin concentrations in top half and bottom half composites are statistically significant.

In summary, none of the concentrations of PBTs observed were high enough to warrant disposal of the sediments as hazardous waste. However, as summarized in Table B-7 below, essentially all of the PBT concentrations observed were high enough to justify recommending that dredged sediments not be placed as wetland surface cover. Some of the PBT concentrations (e.g., total mercury, chlordanes) were high enough to make the deeper sediments unsuitable for placement in wetland foundation (non-cover). Therefore, the preliminary planning decision to assume that all dredged sediments must be disposed of in a local landfill or other upland disposal alternative is supported by these results.

Table B-7 Summary of the most important spatial trends observed in PBT concentrations. Yes / no assessments reflect comparisons at the 95% confidence level, as discussed above

	Mercury	PCBs	DDTs	Chlordanes	Dieldrin
Top > Bottom?	No	Yes	No	No	Yes
Bottom half exceeds cover guideline?	Yes	Yes	Yes	Yes	Yes
Bottom half exceeds non-cover guideline?	Yes	No	No	Yes	No
Factor by which TMDL target exceeded in bottom half	4.5	173	NA	NA	NA

However, this data set is a very limited set of cores collected just outside the Project area, and the data are being compared to guidelines for cover / non-cover that are still in draft form. It may be worth conducting a more thorough assessment of the risks of placement of sediments in wetland foundations (non-cover), and having a discussion of the applicability of draft guidelines with RWQCB and other appropriate resource agencies.

If upland disposal of sediments becomes a significant constraint on the project, it may be worth collecting more cores to depths comparable to projected dredging depths for the project. Dredging alternatives may go deeper, and the vertical profiles of PBTs inside the Project area may look different from the cores analyzed just outside the Project area. The average concentration of top and bottom halves from the composites analyzed may, if mixed, meet the sediment non-cover guidelines. These preliminary findings do not absolutely rule out beneficial re-use of sediments from the Project area in restored wetland foundations (non-cover). The results indicate that more information would be needed before deciding that use in wetland foundations (non-cover) is acceptable.

The general trends of PCBs and legacy organochlorine pesticides observed are consistent with the conceptual models developed for the Bay. All of these compounds have been banned; thus, deeper concentrations tend to be higher than the surface, particularly landward near known sources. There are known historic industrial PCB spill sites in the Guadalupe River watershed, upstream of Alviso Slough. The Santa Clara Valley also has a history of agriculture that would explain the relatively high concentrations of legacy organochlorine pesticides. The differences noted between dieldrin compared to DDT and chlordane is also consistent with the conceptual model developed by Conner et al (2004). Dieldrin is removed from the Bay faster than DDT or Chlordane, because of its relatively higher solubility. Therefore, it is not surprising that surface sediments have much lower dieldrin concentrations relative to guidelines and ambient conditions, and that even deep sediments do not exceed the "non-cover" guideline for dieldrin.

Key recommendations/conclusions from this analysis include:

- The RWQCB may need more information to approve a Report of Waste Discharge and provide a letter certifying protection of water quality (a 401-Cert letter) if the Project is to beneficially re-use sediments as wetland foundation (non-cover) in nearby restoration projects.

- It is likely that pollutant concentration in sediments from the Project area would preclude beneficial re-use of this material as wetland surface cover material.
- It may be necessary to learn more about sediments deeper than six feet, depending on the likelihood and timing of decisions to actively dredge to deeper than six feet.
- It will be important to analyze sediment collected from within the Project area in the future prior to dredging activities if a dredging action is selected.

Also, while not directly related to the Alviso Slough Restoration Project, the following observation was made. The SBSP Restoration Project Phase 1 Action to open a notch between Alviso Slough and Pond A8 may need to be mitigated for the exposure of contaminated sediments, given what we now know about the concentration of PCBs and organochlorine pesticides in deep sediments compared to ambient conditions in Lower South Bay. PCB concentrations at depth exceed long term TMDL targets for PCBs by approximately 173 fold. This potential impact and the mitigation measures have been discussed in the public review draft of the SBSP Restoration Project EIS/R.

Selenium

The current state of knowledge for selenium has been summarized in a conceptual model / impairment assessment report prepared for the Clean Estuary Partnership (Abu-Saba and Ogle, 2005). While selenium is known to accumulate in aquatic ecosystems, there are many important differences that set it apart from the above bioaccumulative pollutants.

Selenium is a naturally occurring element that is an analogue of sulfur, appearing one row below sulfur in the periodic table. Its natural occurrence is in the form of selenate and selenite, which are inorganic ions. Selenite is much more readily accumulated by plants and algae than selenate. After uptake by plants and algae, inorganic selenium is converted to *organoselenium*. Organoselenium refers to many different types of selenium compounds bound to carbon. The most toxic forms, such as selenomethionine, disrupt protein structures by substituting for amino acids that normally contain sulfur. The result can be deformities such as curved beaks, blindness, and mortality in baby birds. In contrast to legacy organochlorine pesticides, the most sensitive selenium management endpoint of concern in the Bay is wildlife, rather than human health.

Selenium is found at elevated concentrations in sedimentary deposits that were once at the bottom of prehistoric seas. This is the cause of the elevated selenium found in marine shales of the Western San Joaquin Valley. Mobilization of selenium from irrigation of these lands, followed by collection of tailwaters in evaporation ponds, led to the well-known disaster at Kesterson Reservoir in California. Widespread bird mortality in that location in the 1980's highlighted the need for selenium management in the San Francisco Bay Delta.

One important difference between selenium and the other bioaccumulative pollutants is solubility. Selenium is much more soluble than mercury, PCBs, or legacy organochlorine pesticides, so numeric endpoints tend to focus on water column concentrations, rather than sediment. However, like other bioaccumulative pollutants, characterizing selenium concentrations in the food web is one of the most important aspects of risk assessment.

The U.S. EPA has established the current water quality objective for selenium at 5 ppb in water through the CTR. U.S. EPA has also reserved this objective, and proposes to develop a more refined water quality objective that considers food web models developed specifically for the Bay – Delta ecosystem.

Selenium in the Regional Setting

The current understanding is that the Bay is *possibly* impaired by selenium. Most of the Bay is in attainment of the 5 ppb water quality objective, but uncertainties remain about risks posed by selenium accumulation in algae, clams, and birds that feed on clams. One of the main reasons selenium was originally listed as impaired was due to concentrations in the livers of diving ducks, which were thought to pose a hazard to human consumers. As discussed in (Abu-Saba and Ogle, 2005), some of the assumptions about human dietary intake of selenium may need to be revisited. However, it is known that selenium concentrations in organisms that feed heavily on benthic invertebrates exceed thresholds for reproductive hazards found in other ecosystems, so there is reason for concern about protection of wildlife in the Bay.

Selenium near the Project Area

The only place in the Bay where selenium exceeds the 5 ppb water quality objective is in the Project area of Alviso Slough (Figure B-13). One possible explanation is the discharge of pumped groundwater from dewatering operations in the lower Guadalupe River. Selenium concentrations are elevated (2-8 µg/L) in groundwater wells in the alluvial plain between Coyote Creek and the Guadalupe River (SCVWD, 1994).

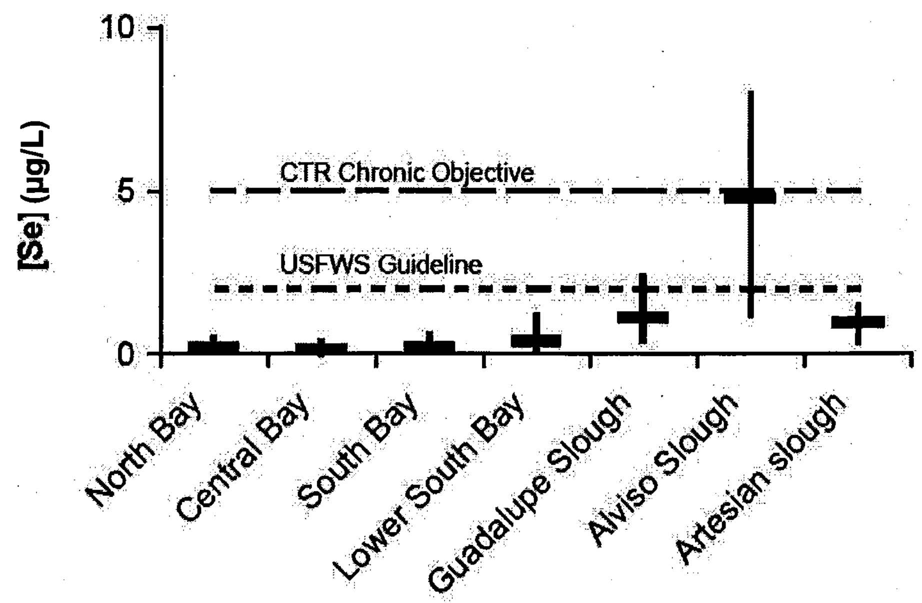


Figure B-13 Selenium Concentrations in Water Measured by the RMP. The solid heavy horizontal lines represents the mean concentration, the vertical lines represent the range. Figure from (Abu-Saba and Ogle, 2005)

Other Bioaccumulative Pollutants not Considered in this Analysis

Polybrominated diphenyl ethers (PBDEs) are an emerging class of chemicals of concern that have recently been identified in Bay fish (SFEI, 2006). PBDEs are analogous to PCBs in structure, with bromine atoms substituted for chlorines. PBDEs are used as flame retardants. Beyond the fact that they accumulate in fish, little is known about the sources, pathways, fate and effects of these compounds.

Polynuclear aromatic hydrocarbons (PAHs) are a class of compounds derived from either direct petroleum-related spills or indirect combustion of petroleum, coal, coke, and other carbon sources. While they can accumulate in fatty tissues, the biomagnification of PAHs is typically not as large as PCBs and other compounds considered. A few of the many PAH compounds (e.g., benzo-a-pyrene) are known or suspected carcinogens. The PAH compounds that are carcinogenic have much lower water quality objectives established in the CTR because of the human-health risk factor involved in setting the objective. As a result, many water column samples in the Bay exceed water quality objectives. However, there has not been not a robust risk-based analysis comparable to PCBs or legacy organochlorine that supports a finding of impairment based on PAH concentrations in fish. Additional information on PAHs in San Francisco Bay water, sediments, and fish is available through the San Francisco Bay Regional Monitoring Program website at http://www.sfei.org/rmp.

Dioxins and furans are inadvertent by-products formed during high temperature combustion processes in the presence of chlorine. Like PCBs, these compounds are potent carcinogens that accumulate in fatty tissues. While dioxins and furans have been detected in Bay fish, there are uncertainties about the risk level posed and hence the level of impairment. The current level of knowledge indicates that stormwater is the primary conveyance of dioxins and furans to the Bay, although the most likely source to stormwater is atmospheric deposition. The U.S. EPA has summarized dioxin issues for San Francisco Bay at http://www.epa.gov/region9/water/dioxin/sfbay.html.

Other toxic pollutants

Trace Metals

In contrast to the bioaccumulative pollutants discussed above, trace metals are of concern because of direct toxicity to aquatic life, rather than accumulation in the food web. The trace metal that has received the most attention in the Bay Area is copper. The mechanism for toxicity for both these metals involves dissolved forms that are available for uptake by one-celled organisms such as algae and the larvae of fish and bivalves. Consequently, water quality objectives for these metals are expressed as dissolved concentrations, i.e., the concentration in water that can pass through a 0.45 μm filter.

Trace Metals in the Regional Setting

A site specific water quality objective for copper has recently been developed for far South Bay and adopted by the San Francisco Bay RWQCB (San Francisco Bay RWQCB, 2002). This objective of 6.9 μg/L is attained throughout far South Bay (Figure B-14). Consequently, far South Bay is not listed as impaired due to copper.

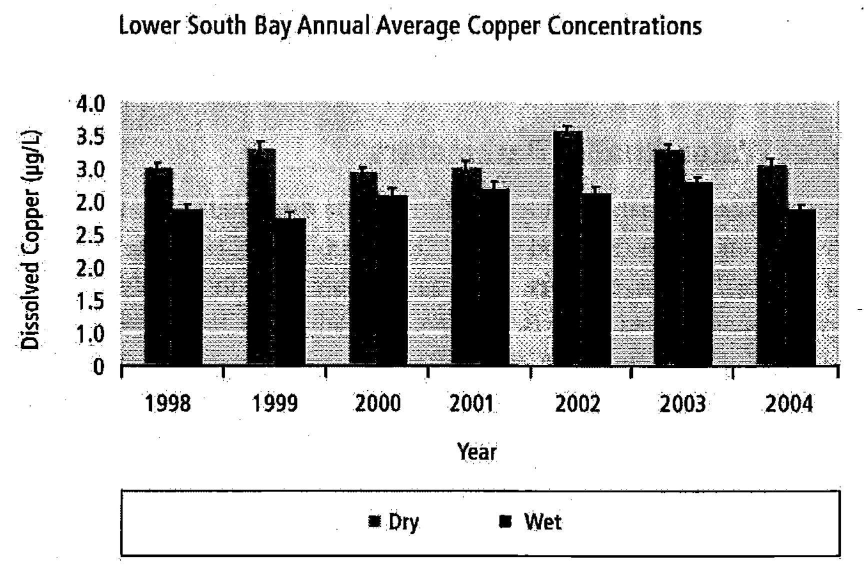


Figure B-14 **Concentrations of Dissolved Copper in Far South Bay. Figure from (SFEI, 2006), referenced to Dunlavey, E. and P. Schafer, 2006, poster presented at the National Water Quality Monitoring Conference, San Jose, CA.**

Copper concentrations in sediments are known to be elevated by about 30 percent compared to prehistoric conditions in the Bay. This is suspected to be a result of runoff from paved streets that contains finely abraded copper from the copper lining of automobile brake pads. Consequently, the site specific objective for copper is coupled to a copper action plan that requires continued monitoring of copper in water and sediments and corrective actions if there is a detected risk of increasing copper concentrations in Bay sediments or water.

Trace Metals near the Project Area

Copper concentrations and processes in Alviso Slough are comparable to the regional setting. Other trace metals of note include nickel, lead, and silver. Naturally occurring serpentine minerals from Franciscan Formation sediments tend to have elevated nickel concentrations (Andersen, 1998). Therefore, naturally occurring nickel concentrations in Bay sediments (approximately 110 ppm) can exceed median effects range (51.6 ppm). This is not considered to be an effect of concern. Lead concentrations in sediments of Alviso Slough are elevated as a result of legacy releases, primarily from leaded gasoline. There are discreet areas known to have elevated soil and sediment lead concentrations (Earth Tech, 2006), so this may need to be considered when evaluating deep sediments for other contaminants of concern.

Petroleum Hydrocarbons

Petroleum hydrocarbons typically enter the environment as a result of fuel spills from storage tanks and fueling operations. Exposure to fuel spills can result in larval abnormalities in some aquatic organisms (Singer et al., 1998). Much larger fuel spills can lead to the tarring of charismatic megafauna such as seals, otters, and birds, as was seen in the Exxon Valdez oil spill. Fuel and oil spills do not occur with any significant frequency in the regional setting of far south Bay, as oil tanker and other large vessel traffic is confined to the northern and central reaches of the Bay. Moderate contamination of total petroleum hydrocarbons (TPH) was identified in soils and sediments near the Project area (Earth Tech, 2006), possibly as a result of previous vessel traffic or storage of abandoned boats in and around the Alviso Marina.

Fisheries Habitat Water Quality Parameters

Water quality concerns related to healthy habitat for fish include dissolved oxygen, turbidity, salinity, and temperature. Tidal waters such as the Bay and Alviso Slough are designated in the Bay Basin Plan as cold and warm water fish habitat. For these waters, water quality objectives for dissolved oxygen, turbidity, salinity, and temperature are specified in the Basin Plan. The salt ponds in the greater South Bay and Project area are designated as estuarine habit. The definition of estuarine habitat in the San Francisco Bay RWQCB Basin Plan recognizes that "Estuarine habitat is generally associated with moderate seasonal fluctuations in dissolved oxygen, pH, and temperature and with a wide range in turbidity."

Dissolved Oxygen

Dissolved oxygen in surface waters is required for aquatic life to breathe. The target dissolved oxygen concentration for a healthy ecosystem is dependent on the environment. For the regional area and Alviso Slough, concentrations of at least 5 mg/L oxygen are desired to support fish. The Basin Plan sets the dissolved oxygen objective at 5 mg/L but acknowledges that a 3 month median concentration of 80 percent oxygen saturation is sufficient to protect beneficial uses of the area. In the adjacent salt ponds and tidal marsh, lower dissolved oxygen concentrations are a natural occurrence. Oxygen is consumed by chemical and biological processes. Factors typically leading to oxygen depletion in estuarine environments are increased phytoplankton growth, low flow rates and low mixing as discussed in the SBSP Restoration Project Nutrient and Contaminant Analysis Report (Brown and Caldwell 2006).

Dissolved Oxygen in the Regional Setting

The RMP measures dissolved oxygen in the water samples they collect from the Estuary. In the 1996 to 2003 dataset, dissolved oxygen in the Lower South Bay ranged from 4.30 to 10.00 mg/L, with 96 percent of measurements equal to or greater than the water quality objective of 5 mg/L. The measurements in the southern sloughs ranged from 0.43 to 12.18 mg/L with 78 percent of measurements equal to or greater than 5 mg/L.

Dissolved Oxygen in Salt Ponds Adjacent to the Project Area

USGS measured dissolved oxygen in Alviso Ponds A8 and A12 during monthly sampling from 2002 to 2006. The majority of measurements ranged from 4 to 10 mg/L. While some measurements were below concentrations considered healthy for aquatic life, the proposed changes to Pond A8 and actions under the adaptive management plan for the SBSP Restoration Project are expected to improve dissolved oxygen in the salt ponds and mitigate potential adverse affects on Alviso Slough.

Turbidity

Turbidity is a measure of the clarity of the water. Low turbidity measurements indicate clear water. Suspended sediments can cloud the water, making it difficult for fish to see their prey. Unstable stream banks and upstream activities such as road construction can lead to increased suspended sediments, and therefore increased turbidity, in the water. Mixing from river flows and tides can also increase the turbidity of the water.

Salinity

Salinity is a water quality concern as it relates to aquatic species health. Different salinity concentrations support different species in the Estuary. Salinity discussion is presented in Section 3.1 Hydrology and Geomorphology.

Temperature

Temperature in the Regional Setting

Temperature data collected by the RMP sampling in the lower South Bay and South Bay sloughs ranges from 8 to 25 degrees Celsius (deg. C). The median temperature is 19 deg. C. Water temperature is expected to vary seasonally with ambient air temperature and changes in tides and freshwater inflows.

Temperature in Salt Ponds Adjacent to the Project Area

USGS collected temperature data from Alviso Ponds A8 and A12 during monthly sampling from 2002 to 2006. Temperatures in both ponds ranged from about 10 to 28 deg. C with the lowest temperatures in December and the highest in July (Takekawa et al., 2005). Typical temperature conditions in Pond A8 will change if the pond is opened to tidal action and the average water depth is increased as planned under the South Bay Salt Pond Restoration Project (Phillip Williams and Associates, 2006).

Aesthetics

Aesthetic concerns related to water and sediment quality in the Alviso area include trash, phytoplankton, and odors. It is important to consider aesthetics of water and sediment quality when evaluating project alternatives to help ensure the project objective of improved recreation and tourism opportunities is met.

Trash

Trash is introduced to the watershed by people littering directly near the water and indirectly through stormwater flows. Stormwater runoff can carry litter from parking lots, roads, and adjacent areas to creeks and sloughs via overland flow and stormwater drains.

Trash in the Regional Setting

The District participates in the Creek Connections Action Group which sponsors two volunteer creek cleanup days a year in Santa Clara County. On National River Cleanup Day in May 2006 volunteers removed more than 12,500 pounds of trash and recyclables from creeks in Santa Clara County (http://www.cleanacreek.org/nrcresults2006.htm). On Coastal Cleanup Day in September 2006 volunteers removed another 22,464 pounds of trash and 5,503 pounds of recyclables from creeks in Santa Clara County (http://cleanacreek.org/ccdresults2006.htm). The District also sponsors an Adopt-A-Creek program where volunteers help preserve the health and beauty of local creeks year-round. As noted in the regulatory discussion above, TMDLs to manage and control the amount of trash reaching Guadalupe River and Coyote Creek will likely be developed during the time span of the Alviso Slough Restoration Project. The eastern, urbanized portion of the reach of the slough through the Project area was adopted by the South Bay Yacht Club in the District Adopt-A-Creek program.

Phytoplankton

Phytoplankton are the unicellular species at the base of the food chain, often referred to as algae. Phytoplankton grow through photosynthesis, converting light energy and nutrients to cell mass, and die naturally and through predation by zooplankton in the water column and mollusks and other benthic feeders in the sediment. Excessive phytoplankton growth and subsequent die-off can lead to low dissolved oxygen concentrations in the water column, adversely affecting fish and wildlife. Noxious odors may also result from excessive phytoplankton in surface waters. The main factors controlling phytoplankton growth are light and nutrient availability. Further information on phytoplankton growth and its effects on dissolved oxygen are documented in the Nutrient and Contaminant Analysis Report prepared by Brown and Caldwell for the SBSP Restoration Project (Brown and Caldwell, 2006).

Phytoplankton in the Regional Setting

In San Francisco Bay, phytoplankton growth was historically limited to relatively low growth throughout the year with the exception of a period of rapid growth, or bloom, in the spring. Since the late 1990's, growth in the Bay has increased including larger spring blooms, new autumn-winter blooms, and increased baseline phytoplankton levels throughout the year (SFEI 2006 Pulse of the Estuary). The exact cause for this increase in phytoplankton in the Bay is not known, various hypotheses and more information on the phytoplankton changes are presented in SFEI's 2006 Pulse of the Estuary.

Phytoplankton in Salt Ponds Adjacent to the Project Area

Within the SBSP Restoration Project area, the areas of concern for potential phytoplankton nuisance are Ponds A8 and A12 of the Alviso Salt Pond Complex. Nuisance phytoplankton growth leading to low dissolved oxygen conditions has been documented under current operations of the salt ponds guided by the Interim Stewardship Plan (ISP update august 2005). Problems in the Alviso area occurred in Ponds A3W, A7, A14 and A16. The SBSP Restoration Project plans to open Pond A8 to tidal action, lowering the risk of nuisance algae growth, in 2008 (PWA et al 2006, SBSP Restoration Project Final Alternatives Report).

POLLUTANT MASS CALCULATIONS

The mass of some PBTs (mercury, PCBs, DDT, and chlordane) in the sediments to be dredged from the slough under Alternatives 3, 4, and 5 were calculated for the impacts analysis. Descriptions of the project alternatives are provided in Chapter 2.0 of the EIR. The masses calculated are presented in Table B-8, below. Values for the entire Bay and the far South Bay (south of the Dumbarton Bridge) are provided for comparison.

Pollutant mass calculations were completed with the methods presented in Abusaba and Tang (2000). The range for each contaminant accounts for both a range in assumed contaminant concentration in the sediments and a range in area for San Francisco Bay (All Bay) and the far South Bay. The area of the submerged sediments in the Bay and far South Bay varies with the tidal cycle. Minimum values are presented in Table B-9 and maximum values in Table B-10.

Table B-8 Mass of PBTs in San Francisco Bay, Far South Bay, and Alviso Slough Sediments

Mass (kg):	All Bay (upper 10 cm)	Far South Bay (upper 10 cm)	Alviso Slough: 48,000 yd^3 sediment	Alviso Slough: 160,000 yd^3 sediment
Mercury	44,000 - 64,000	600 - 1,300	16 - 25	52 - 84
PCBs	1,200 - 2,900	40 - 90	2 - 3	5 - 12
DDT	250 - 1,100	10 - 40	0.6 - 1.0	2 - 3
Chlordane	62 - 143	0.6 - 11	0.1 - 0.3	0.3 - 1.0

Calculations of dry sediment mass were carried out with the two equations below. Equation 6 is applied to sediments in tributaries to the Bay, in this case the sediments in Alviso Slough, where the density of wet sediment is assumed to be 528.5 kg/m^3 (33 lb/ft^3). This value accounts for the interstitial water mass and assumes a water content of about 80 percent in the dredged sediments. Equation 7 is applied to the active layer (top 10 cm) of the Bay and far South Bay sediments and assumes the water content is 50 percent. Dredged sediments typically have a higher water content than bedded sediments.

Equation 1

$$\text{Mass Dry Sediment (kg)} = \frac{\text{Volume Wet Sediment (yd}^3\text{)}}{1} \cdot \frac{1\ \text{m}^3}{1.308\ \text{yd}^3} \cdot \frac{528.5\ \text{kg}}{1\ \text{m}^3}$$

Equation 2

$$\text{Mass Dry Sediment (kg)} = \frac{\text{Volume Wet Sediment (m}^3\text{)}}{1} \cdot \frac{50\ \text{kg dry sediment}}{100\ \text{kg wet sediment}} \cdot \frac{2650\ \text{kg}}{1\ \text{m}^3}$$

The pollutant masses are then calculated by multiplying the pollutant concentration by the dry sediment mass.

Table B-9 Minimum Contaminant Concentrations and Sediment Surface Areas

Minimum Mass Inputs and Concentrations					**All Bay (upper 10 cm)**	**Far South Bay (upper 10 cm)**	**Alviso Slough (48,000 yd^3 sediment)**	**Alviso Slough (160,000 yd^3 sediment)**
				Area (m^2):	**9.41E+08**	**9.00E+06**		
	Contaminant concentration in sediments (ppm):			**Mass (kg):**				
	All Bay	Far South Bay	Alviso Slough	Dry Sediment	1.25E+11	1.19E+09	1.94E+07	6.46E+07
Hg	0.35	0.5	0.8	Hg	43,639	596	16	52
PCBs	0.01	0.03	0.08	PCBs	1,247	36	1.6	5.2
DDT	0.002	0.01	0.03	DDT	249	12	0.6	1.9
Chlordane	0.0005	0.0005	0.004	Chlordane	62	0.6	0.1	0.26

Table B-10 Maximum Contaminant Concentrations and Sediment Surface Areas

Maximum Mass Inputs and Concentrations					**All Bay (upper 10 cm)**	**Far South Bay (upper 10 cm)**	**Alviso Slough (48,000 yd^3 sediment)**	**Alviso Slough (160,000 yd^3 sediment)**
				Area (m^2):	**1.08E+09**	**1.40E+07**		
	Contaminant concentration in sediments (ppm):			**Mass (kg):**				
	All Bay	Far South Bay	Alviso Slough	Dry Sediment	1.43E+11	1.86E+09	1.94E+07	6.46E+07
Hg	0.45	0.7	1.3	Hg	64,157	1,299	25	84
PCBs	0.02	0.05	0.18	PCBs	2,851	93	3.5	12
DDT	0.008	0.02	0.05	DDT	1,141	37	1.0	3.2
Chlordane	0.001	0.006	0.016	Chlordane	143	11	0.3	1.0

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Appendix C

Fish Species of Management Concern – Status and Life Histories

Appendix C – Fish Species of Management Concern – Status and Life Histories

Central California Coast (CCC) Steelhead – Steelhead trout were historically found along the Pacific Rim from Mexico to Alaska and across the Bering Sea in Russia and Japan. The CCC steelhead distinct population segment (DPS) has been listed as threatened under the Endangered Species Act (ESA) (62 Federal Register [FR] 159), and the Guadalupe River is designated critical habitat for this species (65 FR 7764). Very little information about the historical or current abundance of steelhead in the Guadalupe River system is available (SCVWD 2002). Written records dating back to the early 1700s document the presence of steelhead in the Guadalupe River (Leidy et al. 2005), but no available data provide a historical or present-day estimate of the population of adults returning to the river during annual migration. Compared with chinook salmon, steelhead generally migrated farther into tributaries and headwater streams where cool, well-oxygenated water is available year round. However, since the completion of Almaden and Guadalupe Reservoirs in the mid-1930s and Lexington Reservoir in 1952, steelhead have been restricted to tributary streams downstream of the dams. These reservoirs force the steelhead entering the Guadalupe River system to spawn primarily in the lower reaches of the river and in Arroyo Calero and Los Gatos, Guadalupe, and Alamitos Creeks below their dams. Fish ladders at the Alamitos drop structure and Masson Dam (on Guadalupe Creek) currently provide fish access to tributaries and a portion of the upper watershed.

According to Shapovalov and Taft (1954), steelhead migrate up the Guadalupe River from December through March and spawn from January through May (SCVWD 2002) during higher flows and associated lower water temperatures. However, spawning is most-likely to occur before April in much of the Guadalupe River system prior to the seasonal warming of flows. Alviso Slough serves as a migration corridor for adult steelhead moving into and out of spawning habitat areas, and for smolts moving downstream to the Pacific Ocean. Steelhead spawn in cool, clear streams featuring suitable water depth, gravel size, and current velocity (SCVWD 2002). During spawning, the female digs a redd (gravel nest) in the stream bed and deposits her eggs, which are immediately fertilized by the male. Unlike other anadromous Pacific salmonids, steelhead may return to the ocean after spawning, and return to spawn in subsequent years. Egg incubation time in the gravel is determined by water temperature, varying from approximately 19 days at an average water temperature of 15.5 degrees Celsius (°C) to approximately 80 days at an average temperature of 14.5°C (McEwan and Jackson 1996).

Steelhead fry usually emerge from the gravel 2 to 8 weeks after hatching (Barnhart 1986; Reynolds et al. 1993), between February and May, and sometimes extending into June (CDFG 1998). Newly emerged steelhead fry move to shallow, protected areas along streambanks but move to faster, deeper areas of the river as they grow. The period of highest mortality for juvenile steelhead usually occurs in the first few months, when newly emerged fry establish territories, and the population achieves equilibrium with carrying capacity (Murphy and Meehan 1991). Overhanging riparian vegetation, in-stream woody debris, undercut banks, large-particle substrates, and aquatic vegetation provide cover and refugia for young steelhead fry. Juvenile steelhead feed on a variety of aquatic and terrestrial insects, crustaceans, and fish.

Juvenile steelhead may spend one to three years rearing in freshwater before emigrating to the ocean generally from March to June (CDFG 1998). Smoltification, the physiological adaptation that juvenile salmonids undergo to tolerate saline waters, occurs as juveniles begin their downstream migration. Migrating smolt may utilize Alviso Slough marsh edge and open water habitats as rearing and holding habitat during the smoltification process. The vegetated edges of Alviso Slough may provide foraging habitat and protection from predators and water currents. Estuary dependence is highly variable among steelhead populations and it is not known how long juvenile steelhead might rear in Alviso Slough. Scientific literature on steelhead rearing in estuaries is limited and what does exist has mostly been developed for coastal estuaries with lagoons that form during summer months (Cannata 1998, Bond 2006). While this information suggests that estuaries with lagoons along the north and central coast of California provide valuable rearing habitat for juvenile steelhead, these systems are much different in physical, chemical, and biological character when compared to Alviso Slough.

Fall-run Chinook Salmon – Chinook salmon is distributed along the Pacific Rim from southern California to Alaska and across the Bering Sea to Russia and Japan. There are no historical accounts of chinook salmon migrating and spawning in the Guadalupe River, although fall-run chinook salmon have inhabited the river during at least the last decade (Hanson unpublished draft 2004). NMFS considers the chinook salmon in the Guadalupe River to be part of the Central Valley fall-/late-fall run chinook salmon Evolutionarily Significant Unit (ESU) (SCVWD 2002), and genetic analysis of samples from chinook salmon in the watershed has proven that these are Central Valley ESU fish of hatchery origin (Hedgecock and Garcia-Rossi 2002). NMFS has determined that the Central Valley fall-/late-fall run chinook salmon does not warrant listing; however, it is considered a species of concern due to concerns over specific risk factors (69 FR 19975). Nevertheless, because the fall-run chinook salmon in the Guadalupe River are believed to be of hatchery origin and it is not known if they have naturalized, the species of concern listing status would not apply (SCVWD, pers. comm., 2007; Hedgecock and Garcia-Rossi 2002). Alviso Slough and the Guadalupe River is nonetheless designated as Essential Fish Habitat (EFH) for chinook salmon under the Magnuson-Stevens Act, as amended by the Sustainable Fisheries Act of 1996 (PL 104-267).

Salmon generally enter the Guadalupe River from August through December and spawn from October through February. During spawning, the female digs a redd in which she deposits her eggs, which are then fertilized by the male. Optimal water temperatures for egg incubation are 6.7°C to 12.2°C. The duration of egg incubation and time of fry emergence depends largely on water temperature. In general, eggs hatch after a three- to five-month incubation period, and alevins (yolk-sac fry) remain in the gravel until their yolk-sacs are absorbed (two to three weeks) (Scott and Crossman 1973).

Juveniles typically rear in freshwater (in their natal streams and Bay tributaries) for up to five months before entering the ocean, but may spend time in estuarine or brackish conditions. In a 2002 study that serves here as a point of reference, MacFarlane and Norton (2002) found juvenile chinook salmon to be 136 (mean) days old at the confluence of the Sacramento and San Joaquin Rivers, therefore spending less than 4 months in the freshwater environment. Juveniles migrate downstream during January through June, preferring water depths of 0.5 to 3.3 feet and velocities of 0.26 to 1.64 feet per second (Raleigh et al. 1986). Important in-stream habitat for juvenile chinook salmon includes flooded bars, side channels, and overbank areas with relatively low water velocities.

Cover structures, space, and food are necessary components for chinook salmon rearing habitat. Suitable habitat includes areas with instream and overhead cover in the form of undercut banks, downed trees, and large, overhanging tree branches. The organic materials forming fish cover also help provide sources of food, in the form of detritus (food web production) and both aquatic and terrestrial insects. Suitable habitat in Alviso Slough would likely be along the open water-marsh interface or immediately within the marsh vegetation. In addition to insects, the diet of juvenile salmon may also include crustaceans and fish.

Juvenile chinook salmon move out of upstream spawning areas into downstream habitats in response to many factors, including inherited behavior, habitat availability, flow, competition for space and food, fish size, and water temperature. Storm events and the resulting high flows appear to trigger movement of substantial numbers of juvenile chinook salmon to downstream habitats, or they may simply be pushed downstream by elevated flows. In general, juvenile abundance in downstream rearing areas increases as flow increases (USFWS 1993). Rearing time in the estuarine environment is also highly variable among salmon populations. Assuming chinook salmon in the Guadalupe River behave similar to Sacramento River chinook, they move quickly through the estuary and migrate directly to the ocean (MacFarlane and Norton 2002). Populations in the Pacific Northwest are generally estuary-dependent and spend extended time rearing in the estuarine environment; however, MacFarlane and Norton (2002) found Central Valley chinook salmon to move quickly through the San Francisco Bay, spending an average of 40 days moving from the confluence of the Sacramento and San Joaquin Rivers to the Pacific Ocean.

Fall-run chinook salmon emigrate as fry and sub-yearlings and remain off the California coast during their ocean migration for one to five years before returning to their natal stream to spawn (63 FR 11481, March 9, 1998).

Green Sturgeon – The green sturgeon is a primitive, bottom-dwelling fish found from Ensenada, Mexico, to the Bering Sea and Japan (Wang 1986). It is characterized by its large size (up to 7 feet long and 350 pounds) and long, round body. It is known to migrate up to 600 miles between freshwater and saltwater environments and is commercially caught in the Columbia River and coastal Washington (PSMFC 2006). Very little is known about the life history of the green sturgeon relative to other fish species. Populations exist in the San Francisco Bay, the Klamath River, and farther north in the Rogue and Columbia Rivers. It is an anadromous fish that spends most of its life in salt water and returns to spawn in freshwater. It is slow growing and late maturing and may spawn as little as every 4 to 11 years, beginning at age 15. Individuals congregate in the bays of these systems in summer, while some may travel upstream to spawn in spring and summer.

Spawning occurs in the lower reaches of large rivers with swift currents and large cobble. Adults broadcast spawn in the water column, and fertilized eggs sink and attach to bottom substrate until they hatch (PSMFC 2006). Flow has been identified as the key determinant to larval survival; therefore, water diversions and low dam releases may negatively impact green sturgeon survival rates (PSMFC 2006). Juveniles feed on algae and small invertebrates and migrate downstream before they enter their third year of life. They may remain in the estuary for a short time before entering the ocean to feed on benthic invertebrates and fish.

Green sturgeon can be commonly found in San Francisco Bay along with their close relative, the white sturgeon. Spawning is not thought to occur in tributaries to the South Bay such as Alviso Slough; however, individuals may be present within South Bay habitat areas. Catches of sturgeon have been documented by recreational anglers in Alviso Slough and nearby Coyote Creek, and individual fish are thought to feed in the region (Fishing Information Exchange 2006). Due to their slow growth, large size, late maturity, and low productivity, sturgeon populations are extremely vulnerable to overfishing and habitat degradation. Population declines have been witnessed mainly through commercial fishery catch data (NMFS 2004). Due to their vulnerability and observed population decline, green sturgeon has recently been listed as threatened by the National Marine Fisheries Service (NMFS) (71 FR 17757, April 7, 2006).

Longfin Smelt – The longfin smelt was the most abundant smelt species in the Bay-Delta estuary prior to 1984 and has been commercially harvested and sold in local fish markets (Wang 1986). It is distributed from Prince William Sound, Alaska, down to the Sacramento-San Joaquin estuary where it has recently (February 8, 2008) been designated a Candidate species by the California Fish and Game Commission. (The Commission will make a final decision on the listing by August 2008.) Although not listed by USFWS under the ESA when it was proposed in 1993, this species is still addressed in biological assessments because of the decline in their populations after 1982 (Wernette 2000). Additionally, a petition to list the longfin smelt under ESA was recently submitted by the Bay Institute and is currently under review. Longfin smelt populations are centered in north San Francisco Bay, mainly in Suisin and San Pablo Bays. However, individuals have been collected in the South Bay including Alviso Slough and may utilize habitat areas within Alviso Slough with the same physical parameters as those in the north Bay (USGS, unpublished data 2005). Longfin smelt spawn in freshwater, primarily in the upper end of Suisun Bay and in the lower and central Delta. Spawning may take place as early as November and extend into June and occurs over sandy-gravel substrates, rocks, or aquatic plants. In the South Bay, longfin smelt may spawn in the lower reaches of the Guadalupe River where spawning habitat is adequate and suitable substrate is available. After hatching, larvae develop a gas bladder and move up into surface water and are transported downstream into fresh to brackish water nursery areas such as Alviso Slough. Higher outflow increases larval dispersal and the area available for rearing (Wernette 2000). They consume mysids, copepods, and crustaceans and are preyed upon by fishes, birds, and marine mammals.

In the Bay-Delta, the decline in longfin smelt numbers is associated with freshwater diversions from the Delta. Longfin smelt may be particularly sensitive to habitat alterations and pollution because their 2-year life cycle increases the likelihood of extinction after consecutive periods of reproductive failure (Wernette 2000). Except when spawning, longfin smelt are most abundant in Suisun and San Pablo Bays where salinity generally ranges from 2 to 20 parts per thousand (ppt). Sufficient winter flows are critical for the health of the longfin smelt population; high outflows increase dispersion downstream, available habitat, and possibly food availability (Wang 1986).

Northern Anchovy – The northern anchovy has the largest biomass and is the most abundant fish in San Francisco Bay. Its range is from Cape San Lucas, Baja California, to Queen Charlotte Island, British Columbia (McGowan 2000). It is an important forage species for larger predators and consumes substantial amounts of plytoplankton and zooplankton. There is a bait fishery for northern anchovy at the mouth of the Bay, but most of the stock occurs outside the Bay in the California Current (McGowan 2000). Although biomass is centered in the California Current, the Bay is a favorable habitat for reproduction because of ample food supply for adults to produce eggs, abundant zooplankton for larvae, and protection of eggs and larvae from offshore transport to less productive areas by coastal upwelling (McGowan 2000).

Northern anchovy are broadcast spawners and may spawn two to three times a year (Wang 1986). Peak spawning generally occurs at night in channels where the larvae seek out the productive shallows. Eggs incubate for about 48 hours, postlarvae float near the surface, and juveniles use inshore bays and estuaries as nursery ground, while adults use offshore waters as recruitment areas (Wang 1986). Larvae eat dinoflaggelates and zooplankton while adults filter-feed in dense patches of large phytoplankton or small zooplankton. Northern anchovy occupy surface areas where water temperature is between 10 and 25°C. Eggs tend to be in salinities from 32 to 35 ppt, but juveniles and adults are abundant in fresher bays and estuaries, as well as in marine waters (McGowan 2000). Northern anchovy are found inside the Bay throughout the year, but their seasonal peak is from April to October. Northern anchovy have been sampled in Alviso Slough; however, utilization of specific habitats is not clearly understood. Juveniles and adults may move into Alviso Slough to forage, and juveniles may utilize the slough as a nursery ground.

Northern anchovy is included in the list of coastal pelagic species for which EFH has been identified under the Magnuson-Stevens Fishery Conservation and Management Act (as amended). Alviso Slough and the South Bay have been designated as EFH for northern anchovy.

Topsmelt – Topsmelt are a small food fish taken by recreational anglers and are one of the most abundant fish species occurring in shallow-water sloughs of South San Francisco Bay (Saiki 2000). They have the potential to occur from the Gulf of California northward to Vancouver Island, but are usually rare north of Tillamook Bay, Oregon. While commercial fishing for smelt occurs in California, topsmelt comprise only 10 to 25 percent of the total smelt catch. Topsmelt are an important prey item for many piscivorous birds and fishes (Saiki 2000).

Topsmelt move into shallow sloughs and mudflats in late spring and summer to spawn (Wang 1986). Submerged aquatic vegetation, such as algal mats and shallow-water eelgrass beds, is essential for reproduction, as elongate filaments on the eggs become entangled with the substrate (Wang 1986). Temperatures of 10 to 25°C and salinities of less than 72 ppt are required for spawning to occur. Topsmelt are iteroparous and may also spawn multiple times in a given spawning season. Larvae are planktonic and school near the surface among vegetation in shallow open-water areas, particularly in tidal basins, and may follow the salt wedge as it ascends into the upper reaches of the estuary (Saiki 2000). Topsmelt are characterized by an omnivorous diet; they consume mostly plant material (e.g., diatoms, filamentous algae, and detritus) and also planktonic crustaceans (e.g., gammarid and caprellid amphipods, mysids, ostracods, copepods, and crustacean larvae). The different habitats necessary for topsmelt reproduction and rearing are contained within Alviso Slough, including open water channel and submerged aquatic vegetation that could serve as spawning substrate.

Sacramento Sucker – The Sacramento sucker is a native California inland fish widely distributed throughout California and the Sacramento-San Joaquin River system. It is an edible species but not often sought after by fishermen. Sacramento suckers are most common in tributary streams, but are also found in sloughs, irrigation and flood control ditches, and low to mid elevation foothill reservoirs. Spawning occurs for the first time in their fourth or fifth year from February to June in cold water estuary tributaries or foothill streams. Each female, accompanied by several males, deposits eggs over a gravel substrate to which the eggs adhere (Wang 1986). Larvae remain in gravel interstices until the yolk sac is absorbed and postlarvae emerge into the water column in moderate running water and side pools (Wang 1986).

Sacramento suckers primarily consume aquatic insects, detritus, algae, diatoms, and other small organisms (Moyle 2002) and can tolerate salinities to 22.5 ppt. Juvenile and adult suckers may move down into Alviso Slough from the Guadalupe River to inhabit benthic areas within the open water channel.

Longjaw Mudsucker – The longjaw mudsucker is the largest native goby to San Francisco Bay (Hieb 2000). It ranges from Baja California to Tamales Bay and can tolerate extremely high salinities to 84 ppt, and appears to be common in South Bay salt ponds. It is a common resident of mudflats and sloughs in estuaries and coastal streams (Hieb 2000). Due to its ability to survive out of water and in fresh water for a few days, the longjaw mudsucker was commonly used as bait, but is less sought-after since the introduction of the yellowfin goby. Spawning occurs from December to June in burrows constructed by the males in the mud substrate. Females deposit clusters of adhesive eggs to the walls of the burrow and it is aggressively guarded until the eggs hatch. Adults are known to spawn multiple times in a year and larvae have been collected year-round with peak abundance in May and June (Hieb 2000).

In South Bay salt ponds, diet varies with salinity. In lower to mid salinity (20 to 40 ppt), they consume primarily polychaetes and amphipods, while in the higher salinity (to 84 ppt) they consume primarily brine shrimp and water boatmen. Elsewhere, their diet may include gammarid amphipods, polychaetes, dipterans, copepods, green shore crabs, water boatmen, and brine shrimp (Hieb 2000). Longjaw mudsucker are most common in smaller marsh channels. They can handle extremely high salinity and are best adapted to temperature between 20 and 30°C (Hieb 2000). During low tide, the mudsucker may stay in its burrow and can survive out of water, as highly vascularized jaw membranes serve as an accessory respiratory apparatus (Weisel 1947). The introduction of the yellowfin goby has both increased competition for resources and decreased fishing pressure on the longjaw mudsucker as it is no longer sought-after for bait. Longjaw mudsuckers can tolerate a wide variety of environmental conditions, and complex tidal sloughs with undercut banks that provide protection from predators are the best habitat for longjaw mudsuckers. For this reason, mature marshes provide much better habitat than young, "restored" marshes (Hieb 2000). Longjaw mudsuckers may spawn and forage in Alviso Slough.

Pacific Staghorn Sculpin – The Pacific staghorn sculpin is native to the Bay-Delta and is locally abundant there. Its range spans from San Quintin Bay, Baja California, to Karluk, Alaska and in San Francisco Bay and has been used as a bait species by sport fishermen. Pacific staghorn sculpin move freely from fresh to salt waters and occur together with gobies and other sculpins. They are considered an indicator of stress in the estuarine environment and may spend their whole lives in Pacific coast estuaries (Tasto 2000). Spawning takes place from October through early April in polyhaline (18 to 30 ppt) and mesohaline (5 to 18 ppt) waters of the estuary. Eggs are adhesive and deposited in shallow subtidal and intertidal waters on muddy or sandy bottoms or on firm, rocky substrates (Wang 1986). Eggs sink towards the bottom, hatch most successfully at 26 ppt, and larvae survive best at 10 to 17 ppt (Tasto 2000). After an incubation period of 8 to 15 days, newly hatched larvae swim to the surface, though some may remain on the bottom for a short time before becoming planktonic swimmers. The juvenile stage appears to be the most euryhaline (tolerant of a wide variety of saltwater conditions), preferring shallow inshore water and sloughs, with the maturing and adult forms most-likely to be found in higher salinity waters. Adults can survive in salinities up to 67.5 ppt at 12°C, but gradually lose tolerance of high salinities as temperatures rise to 25°C (Tasto 2000).

Larvae are planktivorous, but may consume amphipods, Nereid worms, and small anchovy. Juvenile and adult forms are demersal predators, particularly over intertidal and shallow subtidal mudflats, and have been shown to feed on a variety of non-burrowing benthic organisms (Tasto 2000). Food items include bay shrimp, bay goby, mud crab, callianassid shrimp, and a variety of amphipods, isopods, and polychaetes. Pacific staghorn sculpin are an important prey item for waterfowl. Staghorn sculpin may be found in Alviso Slough in all life stages along the benthic substrate or at the surface as larvae.

Pacific lamprey – The Pacific lamprey (*Lampetra tridentata*) is a slender, round, elongate fish with a flexible cartilaginous body that lacks scales. Resembling an eel in form, it has no true fins, bones, or jaws. The mouth of the adult Pacific lamprey is a downturned sucking device with sharp rasping teeth that is used for clinging to hard substrates or other fish. Pacific lamprey are found in the same range as Pacific Salmon around the Pacific Rim and are also similar in that they are born in freshwater streams, migrate out to the Pacific Ocean, and return to fresh water as mature adults to spawn (Moyle 2002). After spending up to two to three years in the ocean, adult Pacific lamprey move up into spawning streams from July to October, however, spawning does not occur until the spring (Moyle 2002). Mating pairs of lamprey construct a nest by digging together using rapid vibrations of their tails and by moving stones using their suction mouths. Spawning females attach themselves to an upstream rock and desposit 10,000 to 200,000 tiny eggs into the gravel nest as the male, attached to the female or a nearby anchor, fertilizes the eggs with his milt. Most Pacific lamprey die after spawning; however, some adults have been known to survive and spawn again a year later (Moyle 2002). After eggs hatch in approximately two to three weeks, the larvae (amnocoetes) burrow tail first into mud or soft substrate where they filter feed on algae and organic matter. The larval lampreys often move around the stream during their five to seven year stay in freshwater. When the ammocoetes reach a length of around 14 to 16 cm they begin a drastic change in physiology and physical appearance. The larval lampreys take on a silvery form with large eyes and a sucking disc. The newly morphed lampreys swim downstream to the Pacific Ocean where they take on a new predatory lifestyle in an estuarine or saltwater environment, rarely straying far from the mouth of their home stream. Pacific lampreys attack and feed on fish, including salmon and flatfish.

Pacific lamprey occur in tributaries to the San Francisco Bay including Alameda Creek, Coyote Creek, and the Guadalupe River. During 2004, more than 60 adult Pacific lampreys were recorded by District biologists monitoring an out-migrant trap on the lower main stem of the Guadalupe River (SCVWD 2004).

Threespine Stickleback – The threespine stickleback is of no commercial economic value, but is important scientifically, especially to evolutionary biologists. It is widely distributed throughout the northern hemisphere, but most commonly found in estuarine waters. In the Pacific, the threespine stickleback is known from Baja California to the Bering Sea, commonly found throughout the Bay-Delta estuary (Wang 1986). It usually completes its life cycle in one year, but may live up to three years.

Spawning occurs from March through October when water temperature reaches about 12–15°C. The male builds a nest out of plant sections and renal secretions that may vary in form. The female deposits eggs in the nest before being driven away by the male. The male enters the nest to fertilize the clusters of eggs and stands guard, fanning the eggs with his pectoral fins and cleaning the eggs with his mouth until hatching time. He crushes the egg clusters so the individual eggs scatter and finally hatch after 7 days (at 19°C). Once larvae achieve full swimming ability, they disperse into shallow water with dense vegetation

(Wang 1986). They are visual feeders and feed primarily on small benthic organisms or organisms living on submerged, rooted, or floating vegetation, such as insect larvae. Threespine stickleback may spawn multiple times in a breeding season. They can tolerate most habitats, with temperature being the limiting factor (24°C). Threespine stickleback may be found within the submerged marsh vegetation in Alviso Slough.

Striped Bass – Striped bass is an anadromous species native to the Atlantic Ocean from the St. Lawrence River to the St. Johns River in Florida and along the Gulf Coast to Louisiana (Raney 1952). It was introduced into the San Francisco Bay estuary in 1879, leading to a successful commercial fishery within 10 years. In 1935, the fishery was banned following a substantial decline in abundance. Currently, it is the principal sport fish caught in the Bay-Delta and is estimated to bring approximately $45 million into local economies (Sommer 2000). Striped bass are present in the Bay throughout the year, but congregate in San Pablo and Suisun Bays in autumn, and move into the Delta and Sacramento River system on their spawning migration during winter and early spring. The timing and location of spawning depends on temperature (optimal is 15.6–20°C), salinity, and flow but typically peaks in May and early June (Sommer 2000). Striped bass spawn in freshwater and have exceptionally high fecundity. Females broadcast semi-buoyant eggs into the water column and drifting eggs hatch in the current in about 2 days. Larvae are most abundant in the upstream edge of the entrapment zone, located at a salinity of approximately 2 ppt (Sommer 2000).

Striped bass are gregarious pelagic predators found in the Bay-Delta year-round. As juveniles, they begin feeding on invertebrates including cladocerans and copepods. As they become larger, opossum shrimp and threadfin shad become more important food sources. Sub-adults and adults are primarily piscivorous, although they remain highly opportunistic depending on available prey. Populations have declined in the San Francisco Bay over the past 30 years. Pollution, competition for prey species, and water diversions may all negatively effect striped bass survival (Sommer 2000). Striped bass larvae likely rear in Alviso Slough and juveniles and adults may move into the slough to forage.

American Shad – American shad is an anadromous species of the herring family native to the Atlantic Coast; it was introduced to the Sacramento River in 1871 and planted there for the next 10 years. Its current distribution in western North America is from Todos Santos Bay, Baja California to Alaska and Kamchatka (Wang 1986). American shad are harvested both recreationally and commercially and the roe is considered a delicacy to certain cultures. Spawning takes place in open waters of mainstem rivers from April through June. Females release eggs into the water column, generally during midnight hours, and the males fertilize the eggs when released. Eggs tend to sink near the bottom, but a moderate current will keep them floating (Wang 1986). The incubation period lasts between 8 and 20 days before larvae are born. Newly hatched larvae are pelagic and most abundant near the water surface. Some larvae move downstream soon after hatching but the majority remain in the river and estuary for several months. Some juveniles move directly through the estuary in summer. Juveniles feed on copepods, related crustaceans, and insect larvae while in fresh water and on mysid shrimp and amphipods while in the estuary. They spend three to five years in the ocean before returning to the river to spawn (Wang 1986). American shad can tolerate temperatures from 8 to 25°C. American shad may spawn in the Guadalupe River; larvae and adults may move into the open waters of Alviso Slough to mature and forage on their migration towards the ocean.

Threadfin Shad – Threadfin shad is native to streams flowing into the Gulf of Mexico and the Gulf of Honduras as far South as Belize. Individuals were collected from the Tennessee River in 1953 and introduced in San Diego County and then into numerous reservoirs in northern California and the Sacramento-San Joaquin Bay-Delta system (Wang 1986). Threadfin shad are often used as a baitfish. They prefer oligohaline (0.5 to 5 ppt)-to-freshwater salinity ranges and are temperature sensitive especially below 7°C. Spawning occurs in freshwater in late spring and summer, with peaks from May to July (Wang 1986). Females deposit eggs on submerged vegetation in shallow water and also on floating debris in single layers, and the incubation period lasts 3–6 days. Newly hatched larvae are planktonic and exhibit diel migratory behavior: that is, they are found near the surface during daytime and descend to mid-depths or lower at night (Taber 1969). Juveniles typically form schools in areas with moderate current. They are mainly limnetic particulate feeders on larger plankton and filter feeders on smaller plankton, although they may feed on the bottom or on fish larvae (Wang 1986). Threadfin shad are likely found in open waters of Alviso Slough migrating through or feeding at a number of different depths.

Yellowfin Goby – The yellowfin goby is an estuarine fish native to Japan, Korea, and northern China that was accidentally introduced into the Bay-Delta estuary in the 1950s through the ballast water of ships (Wang 1986). Yellowfin gobies are widespread throughout the Bay and lower portion of tributaries and are used as bait by recreational fishermen. Spawning is thought to occur from December to July in a burrow constructed by the males in intertidal mudflats. Eggs are deposited in a single layer on the wall or roof of the burrow. The female may leave the burrow after spawning or may join the male in guarding the eggs. Larvae are pelagic and prefer higher salinities, but may occur near the bottom of the water column. Juveniles settle on the bottom and their pelvic fins fuse to form a sucking disc to help them cling to substrates or crawl into burrows (Wang 1986). Juveniles prefer tidal sloughs with a muddy bottom and peatmoss banks. Their diet includes copepods for juveniles, and amphipods, mysid shrimp, and small fish for large juveniles and adults. Yellowfin goby likely spawn in the mudflats of Alviso Slough.

Rainwater Killifish – The native distribution of the rainwater killifish is along the Atlantic Coast of North America down to Tamaulipas, Mexico, but the species was introduced into several western states in the 1980s (Wang 1986). Populations in the Bay-Delta estuary are very patchy and it is uncertain whether rainwater killfish migrate to freshwater to breed as they do along the Atlantic Coast. Rainwater killifish have no commercial or sport value, but they serve as a forage fish and as potential mosquito control. The spawning period is from April or May through July. After courtship, females deposit a few eggs at a time over vegetation near the water surface in both mesohaline (5 to 18 ppt) and freshwater conditions and the male actively guards his territory (Wang 1986). Eggs have many fine adhesive filaments that attach to the substrate. After hatching in 6 to 12 days (at 25°C) in freshwater to mesohaline conditions, young larvae initially remain on the bottom, but as development proceeds they begin to swim in the dense vegetation. Juveniles are solitary, but may form loose schools and are usually found in aquatic vegetation. The diet of juvenile rainwater killifish includes copepods, mosquito larvae, amphipods, and small insects (Harrington and Harrington 1961). Rainwater killifish would likely be found along the edges of Alviso Slough within the submerged vegetation of the marsh habitats.

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Appendix D

Air Quality Calculations

Urbemis 2007 Version 9.2.2

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\Documents and Settings\phillipsh\Application Data\Urbemis\Version9a\Projects\Alviso.urb9

Project Name: Alviso Slough Alt 5

Project Location: Santa Clara County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2009 TOTALS (tons/year unmitigated)	1.76	17.82	5.44	0.73	6.17	1.14	0.67	1.81	1,893.35
2010 TOTALS (tons/year unmitigated)	0.57	5.77	1.82	0.23	2.05	0.38	0.21	0.59	658.85

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

ROG	NOx	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

2009	1.76	17.82	5.44	0.73	6.17	1.14	0.67	1.81	1,893.35
Fine Grading 06/15/2009-04/15/2010	1.16	11.84	3.49	0.48	3.97	0.73	0.44	1.17	1,264.96
Fine Grading Dust	0.00	0.00	3.48	0.00	3.48	0.73	0.00	0.73	0.00
Fine Grading Off Road Diesel	1.07	10.63	0.00	0.44	0.44	0.00	0.40	0.40	1,068.44
Fine Grading On Road Diesel	0.07	1.17	0.01	0.04	0.05	0.00	0.04	0.04	154.42
Fine Grading Worker Trips	0.02	0.03	0.00	0.00	0.00	0.00	0.00	0.00	42.10
Fine Grading 06/15/2009-09/30/2009	0.60	5.98	1.95	0.24	2.20	0.41	0.23	0.63	628.38
Fine Grading Dust	0.00	0.00	1.95	0.00	1.95	0.41	0.00	0.41	0.00
Fine Grading Off Road Diesel	0.58	5.76	0.00	0.24	0.24	0.00	0.22	0.22	578.74
Fine Grading On Road Diesel	0.01	0.20	0.00	0.01	0.01	0.00	0.01	0.01	26.84
Fine Grading Worker Trips	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00	22.81
2010	0.57	5.77	1.82	0.23	2.05	0.38	0.21	0.59	658.85
Fine Grading 06/15/2009-04/15/2010	0.57	5.77	1.82	0.23	2.05	0.38	0.21	0.59	658.85
Fine Grading Dust	0.00	0.00	1.82	0.00	1.82	0.38	0.00	0.38	0.00
Fine Grading Off Road Diesel	0.53	5.21	0.00	0.21	0.21	0.00	0.19	0.19	556.48
Fine Grading On Road Diesel	0.03	0.55	0.00	0.02	0.02	0.00	0.02	0.02	80.43
Fine Grading Worker Trips	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00	21.94

Phase Assumptions

Phase: Fine Grading 6/15/2009 - 4/15/2010 - Dredging

Total Acres Disturbed: 9.7

Maximum Daily Acreage Disturbed: 2.42

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 532.72

Off-Road Equipment:

5 Cranes (399 hp) operating at a 0.43 load factor for 8 hours per day

2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

8 Other Equipment (190 hp) operating at a 0.62 load factor for 8 hours per day

5 Other Material Handling Equipment (191 hp) operating at a 0.59 load factor for 8 hours per day

3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Fine Grading 6/15/2009 - 9/30/2009 - Site prep/veg removal

Total Acres Disturbed: 25

Maximum Daily Acreage Disturbed: 2.5

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 170.94

Off-Road Equipment:

5 Cranes (399 hp) operating at a 0.43 load factor for 8 hours per day

2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

8 Other Equipment (190 hp) operating at a 0.62 load factor for 8 hours per day

5 Other Material Handling Equipment (191 hp) operating at a 0.59 load factor for 8 hours per day

3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

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Urbemis 2007 Version 9.2.2

Combined Summer Emissions Reports (Pounds/Day)

File Name:

Project Name: Alviso Slough Alt 5

Project Location: Santa Clara County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2009 TOTALS (lbs/day unmitigated)	31.45	317.79	98.56	12.97	111.52	20.60	11.93	32.53	33,681.32
2010 TOTALS (lbs/day unmitigated)	15.20	153.96	48.50	6.08	54.59	10.14	5.60	15.74	17,569.25

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

ROG	NOx	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

Time Slice 6/15/2009-9/30/2009 Active Days: 78	31.45	317.79	98.56	12.97	111.52	20.60	11.93	32.53	33,681.32
Fine Grading 06/15/2009-04/15/2010	16.05	164.43	48.50	6.69	55.19	10.14	6.15	16.29	17,568.93
Fine Grading Dust	0.00	0.00	48.40	0.00	48.40	10.11	0.00	10.11	0.00
Fine Grading Off Road Diesel	14.82	147.69	0.00	6.07	6.07	0.00	5.59	5.59	14,839.43
Fine Grading On Road Diesel	0.98	16.31	0.08	0.60	0.67	0.02	0.55	0.58	2,144.75
Fine Grading Worker Trips	0.25	0.44	0.03	0.02	0.04	0.01	0.01	0.02	584.75
Fine Grading 06/15/2009-09/30/2009	15.39	153.36	50.05	6.28	56.33	10.46	5.78	16.24	16,112.39
Fine Grading Dust	0.00	0.00	50.00	0.00	50.00	10.44	0.00	10.44	0.00
Fine Grading Off Road Diesel	14.82	147.69	0.00	6.07	6.07	0.00	5.59	5.59	14,839.43
Fine Grading On Road Diesel	0.31	5.23	0.02	0.19	0.22	0.01	0.18	0.18	688.21
Fine Grading Worker Trips	0.25	0.44	0.03	0.02	0.04	0.01	0.01	0.02	584.75
Time Slice 10/1/2009-12/31/2009 Active Days: 66	16.05	164.43	48.50	6.69	55.19	10.14	6.15	16.29	17,568.93
Fine Grading 06/15/2009-04/15/2010	16.05	164.43	48.50	6.69	55.19	10.14	6.15	16.29	17,568.93
Fine Grading Dust	0.00	0.00	48.40	0.00	48.40	10.11	0.00	10.11	0.00
Fine Grading Off Road Diesel	14.82	147.69	0.00	6.07	6.07	0.00	5.59	5.59	14,839.43
Fine Grading On Road Diesel	0.98	16.31	0.08	0.60	0.67	0.02	0.55	0.58	2,144.75
Fine Grading Worker Trips	0.25	0.44	0.03	0.02	0.04	0.01	0.01	0.02	584.75

Time Slice 1/1/2010-4/15/2010 Active Days: 75	15.20	153.96	48.50	6.08	54.59	10.14	5.60	15.74	17,569.25
Fine Grading 06/15/2009-04/15/2010	15.20	153.96	48.50	6.08	54.59	10.14	5.60	15.74	17,569.25
Fine Grading Dust	0.00	0.00	48.40	0.00	48.40	10.11	0.00	10.11	0.00
Fine Grading Off Road Diesel	14.07	138.93	0.00	5.54	5.54	0.00	5.10	5.10	14,839.43
Fine Grading On Road Diesel	0.90	14.64	0.08	0.53	0.60	0.02	0.49	0.51	2,144.75
Fine Grading Worker Trips	0.23	0.40	0.03	0.02	0.04	0.01	0.01	0.02	585.06

Phase Assumptions

Phase: Fine Grading 6/15/2009 - 9/30/2009 - Site prep/veg removal

Total Acres Disturbed: 25

Maximum Daily Acreage Disturbed: 2.5

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 170.94

Off-Road Equipment:

5 Cranes (399 hp) operating at a 0.43 load factor for 8 hours per day

2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

8 Other Equipment (190 hp) operating at a 0.62 load factor for 8 hours per day

5 Other Material Handling Equipment (191 hp) operating at a 0.59 load factor for 8 hours per day

3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Fine Grading 6/15/2009 - 4/15/2010 - Dredging

Total Acres Disturbed: 9.7

Maximum Daily Acreage Disturbed: 2.42

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 532.72

Off-Road Equipment:

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5 Cranes (399 hp) operating at a 0.43 load factor for 8 hours per day

2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

8 Other Equipment (190 hp) operating at a 0.62 load factor for 8 hours per day

5 Other Material Handling Equipment (191 hp) operating at a 0.59 load factor for 8 hours per day

3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Appendix E

Noise Calculations

Appendix E1

Alviso Slough Restoration
Alviso, California

Location	Distance to Nearest Receiver in feet	Resulting Cumulative Noise Level (Leq dBA) Unmitigated	Resulting Cumulative Noise Level (Leq dBA) Mitigated
South Bay Yacht Club	125	77.3	65.6
Union Warehouse and Docks	200	73.3	61.5
Summerset Mobile Estates	400	67.2	55.5
Wase's Warehouse	415	66.9	55.2
	500	65.3	53.6
	600	63.7	52.0
	700	62.4	50.7
	800	61.2	49.5
	900	60.2	48.5
	1000	59.3	47.6
	1100	58.5	46.7
	1200	57.7	46.0
	1300	57.0	45.3
	1400	56.4	44.6
	1500	55.8	44.0
	1600	55.2	43.5
	1700	54.7	42.9
	1800	54.2	42.4
Threshold*	425	66.7	55.0

Assumptions:	Reference Noise Levels (L_{max}) @50 feet		
	Unmitigated	Mitigated	Usage Factor
Dozer or Tractor	85	75	0.4
Front-end Loader	85	75	0.4
Excavator	85	75	0.4
Truck	91	75	0.4
Aquamog	85	78	0.5
Harvester	85	78	0.5
			Heff = 10
Calculations:	L_{eq} dBA @ 100 feet		**G** = 0.57
	Unmitigated	Mitigated	
Dozer or Tractor	73.3	63.3	
Front-end Loader	73.3	63.3	
Excavator	73.3	63.3	
Truck	79.3	63.3	
Aquamog	74.3	67.3	
Harvester	74.3	67.3	
Cumulative:	L_{eq} dBA @ 100 feet		
	Unmitigated	Mitigated	
	79.3	67.6	

Sources:

Reference noise levels were obtained from the National Cooperative Highway Research Program, Syntesis 218, Table 3, Constuction Equipment Noise Emission Levels, page 8.

The equation L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50) is found in the NCHRP, Synthesis 218, page 11 "Noise Impact Assessment."

Notes:

* The threshold specific for this Project.

G = the constant that accounts for topography and ground effects.

H_{eff} = the sum of average path heights on either side of a topographical feature. Utilized to determine the **G** factor.

Construction Noise Calculator

Project Name

Project Equipment List	[redacted]		Sensitive Receptor Distance (feet)	Resulting Leq (dBA)	Actual Measured		Sensitive Receptor Distance (feet)	Resulting Leq (dBA)
Backhoe	70.0	10000000			72.0	15773933.61		
Crane	71.0	12649110.64	500	65.5	75.0	31473135.29	500	66.7
Dozer	75.0	31622776.6	1000	59.5	76.0	39622329.81	1000	60.7
Loader	70.0	10000000	2000	53.5	73.0	19858205.87	2000	54.6
Dump Trucks	74.0	25118864.32	1500	56.0	70.0	9952679.26	1500	57.1
			3000	50.0			3000	51.1
Total Leq @100ft	[redacted]		6000	43.9	80.7		6000	45.1

Equipment Description	Acoustical Usage Factor (%)	Spec 721.560 Lmax @ 50ft (dBA slow)	Actual Measured Lmax @ 50ft (dBA slow)	No. of Actual Data Samples (count)	Spec 721.560 LmaxCalc	Spec 721.560 Leq	Distance	Actual Measured LmaxCalc	Actual Measured Leq
Auger Drill Rig	20	85	84	36	79.0	72.0	100	78.0	71.0
Backhoe	40	80	78	372	74.0	70.0	100	72.0	68.0
Bar Bender	20	80	na	0	74.0	67.0	100		
Blasting	na	94	na	0	88.0		100		
Boring Jack Power Unit	50	80	83	1	74.0	71.0	100	77.0	74.0
Chain Saw	20	85	84	46	79.0	72.0	100	78.0	71.0
Clam Shovel (dropping)	20	93	87	4	87.0	80.0	100	81.0	74.0
Compactor (ground)	20	80	83	57	74.0	67.0	100	77.0	70.0
Compressor (air)	40	80	78	18	74.0	70.0	100	72.0	68.0
Concrete Batch Plant	15	83	na	0	77.0	68.7	100		
Concrete Mixer Truck	40	85	79	40	79.0	75.0	100	73.0	69.0
Concrete Pump Truck	20	82	81	30	76.0	69.0	100	75.0	68.0
Concrete Saw	20	90	90	55	84.0	77.0	100	84.0	77.0
Crane	16	85	81	405	79.0	71.0	100	75.0	67.0
Dozer	40	85	82	55	79.0	75.0	100	76.0	72.0
Drill Rig Truck	20	84	79	22	78.0	71.0	100	73.0	66.0
Drum Mixer	50	80	80	1	74.0	71.0	100	74.0	71.0
Dump Truck	40	84	76	31	78.0	74.0	100	70.0	66.0
Excavator	40	85	81	170	79.0	75.0	100	75.0	71.0
Flat Bed Truck	40	84	74	4	78.0	74.0	100	68.0	64.0
Front End Loader	40	80	79	96	74.0	70.0	100	73.0	69.0
Generator	50	82	81	19	76.0	73.0	100	75.0	72.0
Generator (<25KVA, VMS signs)	50	70	73	74	64.0	61.0	100	67.0	64.0
Gradall	40	85	83	70	79.0	75.0	100	77.0	73.0
Grader	40	85	na	0	79.0	75.0	100		
Grapple (on Backhoe)	40	85	87	1	79.0	75.0	100	81.0	77.0
Horizontal Boring Hydr. Jack	25	80	82	6	74.0	68.0	100	76.0	70.0
Hydra Break Ram	10	90	na	0	84.0	74.0	100		
Impact Pile Driver	20	95	101	11	89.0	82.0	100	95.0	88.0
Jackhammer	20	85	89	133	79.0	72.0	100	83.0	76.0
Man Lift	20	85	75	23	79.0	72.0	100	69.0	62.0
Mounted Impact Hammer (hoe ram)	20	90	90	212	84.0	77.0	100	84.0	77.0
Pavement Scarafier	20	85	90	2	79.0	72.0	100	84.0	77.0
Paver	50	85	77	9	79.0	76.0	100	71.0	68.0
Pickup Truck	40	55	75	1	49.0	45.0	100	69.0	65.0
Pneumatic Tools	50	85	85	90	79.0	76.0	100	79.0	76.0
Pumps	50	77	81	17	71.0	68.0	100	75.0	72.0
Refrigerator Unit	100	82	73	3	76.0	76.0	100	67.0	67.0
Rivit Buster/chipping gun	20	85	79	19	79.0	72.0	100	73.0	66.0
Rock Drill	20	85	81	3	79.0	72.0	100	75.0	68.0
Roller	20	85	80	16	79.0	72.0	100	74.0	67.0
Sand Blasting (Single Nozzle)	20	85	96	9	79.0	72.0	100	90.0	83.0
Scraper	40	85	84	12	79.0	75.0	100	78.0	74.0
Shears (on backhoe)	40	85	96	5	79.0	75.0	100	90.0	86.0
Slurry Plant	100	78	78	1	72.0	72.0	100	72.0	72.0
Slurry Trenching Machine	50	82	80	75	76.0	73.0	100	74.0	71.0
Soil Mix Drill Rig	50	80	na	0	74.0	71.0	100		
Tractor	40	84	na	0	78.0	74.0	100		
Vacum Excavator (Vac-truck)	40	85	85	149	79.0	75.0	100	79.0	75.0
Vacum Street Sweeper	10	80	82	19	74.0	64.0	100	76.0	66.0
Ventilation Fan	100	85	79	13	79.0	79.0	100	73.0	73.0
Vibrating Hopper	50	85	87	1	79.0	76.0	100	81.0	78.0
Vibratory Concrete Mixer	20	80	80	1	74.0	67.0	100	74.0	67.0
Vibratory Pile Driver	20	95	101	44	89.0	82.0	100	95.0	88.0
Warning Horn	5	85	83	12	79.0	66.0	100	77.0	64.0
Welder / Troch	40	73	74	5	67.0	63.0	100	68.0	64.0

Source:
FHWA Roadway Construction Noise Model, January 2006.
U.S. Department of Transportation

Appendix E2

FHWA Modeled Off-Site, On-Road Vehicle Noise

```
RUN NAME: HAUL ROUTES-ALVISO SLOUGH
RUN DATE: 11-15-07

    TRAFFIC DISTRIBUTION PERCENTAGES
    DAY       EVENING    NIGHT
    ---       -------    -----
AUTOS
    19.90      0.04       0.01
M-TRUCKS
     0.01      0.01       0.01
H-TRUCKS
    79.90      0.10       0.04

ADT:  200     SPEED:  25     ACTIVE HALF WIDTH (FT):  6.5
SITE CHARACTERISTICS: HARD     GRADE (PERCENT):  0

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  56.35
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL  60 CNEL   55 CNEL
-------  -------  -------  -------
  0.0      0.0      0.0     76.8

RUN NAME: HAUL ROUTES-ALVISO SLOUGH
RUN DATE: 11-15-07

    TRAFFIC DISTRIBUTION PERCENTAGES
    DAY       EVENING    NIGHT
    ---       -------    -----
AUTOS
    19.90      0.04       0.01
M-TRUCKS
     0.01      0.01       0.01
H-TRUCKS
    79.90      0.10       0.04

ADT:  200     SPEED:  35     ACTIVE HALF WIDTH (FT):  6.5
SITE CHARACTERISTICS: HARD     GRADE (PERCENT):  0

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE =  58.49
* *  DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL * *
70 CNEL  65 CNEL  60 CNEL   55 CNEL
-------  -------  -------  -------
  0.0      0.0      0.0     125.4
```

Appendix F

Traffic Impact Analysis

TRAFFIC IMPACT STUDY

ALVISO SLOUGH RESTORATION PROJECT

January 30, 2008

Prepared for: Alviso Slough Restoration Project

Prepared by: Mark D. Crane, P.E.
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I. INTRODUCTION

This analysis was prepared for the Alviso Slough Restoration Project to determine any circulation-related impacts to local freeways and major intersections due to truck traffic associated with the proposed project. Evaluation has been conducted of the I-880 and S.R.237 freeway segments that would serve project trucks, as well as the intersections at all interchanges possibly accommodating any truck traffic. Impact analysis has been conducted for the local roadway system during the weekday AM and PM commute peak traffic hours. Significant impacts have been identified and measures recommended to mitigate impacts to a level of insignificance.

II. VOLUMES

A. EXISTING

1. Intersections

Weekday AM and PM peak period (7:00-9:00 AM and 4:00-6:00 PM) volumes were conducted by All Traffic Data for Crane Transportation Group on December 19, 2007 at the following locations.

- I-880 Northbound Ramps/Dixon Landing Road (City of Milpitas)
- I-880 Southbound Ramps/Dixon Landing Road (City of Milpitas)
- S.R.237 Eastbound Ramps/Great America Parkway (City of San Jose)
- S.R.237 Westbound Ramps/Great America Parkway (City of San Jose)
- S.R.237 Eastbound Ramps/N. 1st Street (City of San Jose)
- S.R.237 Westbound Ramps/N. 1st Street (City of San Jose)
- S.R.237 Eastbound Ramps/Zanker Road (City of San Jose)
- S.R.237 Westbound Ramps/Zanker Road (City of San Jose)
- Gold Street/Great America Parkway Connector Road (City of San Jose)

Figures 1 and **2** present existing AM and PM peak hour volumes, respectively, at all analysis locations. In general, the AM peak hour at the majority of locations was 8:00 to 9:00, while the PM peak hour was 5:00 to 6:00.

2. Freeways

Volumes and densities on the S.R.237 and I-880 freeways were obtained from the *Santa Clara Valley Transportation Authority Year 2006 Monitoring and Conformance Report.*

B. YEAR 2010

Year 2010 was selected as the near term horizon evaluation year as it corresponded to the first year of likely project construction. All year 2007 intersection peak hour volumes were increased at a rate of two percent per year (or a six percent increase) to 2010. All year 2006 freeway volumes were increased at a rate of 0.5 percent per year to 2010 (or a two percent increase). Freeway volume increases were based upon historical Caltrans traffic count information for the S.R.237 and I-880 freeways between 1999 and 2006. No historical traffic count data was available for local intersections, so a higher, more conservative increase was utilized. Year 2010 Base Case (without project) AM and PM peak hour volumes are presented in **Figures 3** and **4,** respectively.

III. INTERSECTION LEVEL OF SERVICE EVALUATION

A. ANALYSIS METHODOLOGY

Transportation engineers and planners commonly use a grading system called level of service (LOS) to measure and describe the operational status of the local roadway network. LOS is a description of the quality of a roadway facility's operation, ranging from LOS A (indicating free-flow traffic conditions with little or no delay) to LOS F (representing oversaturated conditions where traffic flows exceed design capacity, resulting in long queues and delays). Intersections, rather than roadway segments between intersections, are almost always the capacity controlling locations for any circulation system. **Figure 5** provides a schematic presentation of approach lanes and control at each intersection evaluated.

Signalized Intersections. For signalized intersections, the 2000 *Highway Capacity Manual* (Transportation Research Board, National Research Council) methodology was utilized. With this methodology, operations are defined by the level of service and average control delay per vehicle (measured in seconds) for the entire intersection. For a signalized intersection, control delay is the portion of the total delay attributed to traffic signal operation. This includes delay associated with deceleration, acceleration, stopping, and moving up in the queue. Analysis of intersections was conducted using TRAFFIX, the Congestion Management Program's (CMP's) designated standard software package. The use of TRAFFIX and the default values for CMP intersection analysis parameters are provided in Chapter 2 of the Santa Clara VTA *Traffic Level of Service Analysis Guidelines*. The LOS criteria used with the HCM 2000 operational analysis method are presented in **Table 1**.

B. MINIMUM ACCEPTABLE STANDARDS

- Santa Clara VTA and City of San Jose (all ramp intersections along the S.R.237 freeway are included in Congestion Management Program monitoring – at Great America Parkway, N. 1st Street and Zanker Road): LOS E is the minimum acceptable operation.

- The City of Milpitas (Dixon Landing Road/I-880 interchange intersections): LOS D is the minimum acceptable operation.

- The City of San Jose (Gold Street/Great America Parkway connector intersection): LOS D is the minimum acceptable operation.

C. EXISTING OPERATING CONDITIONS

Table 2 shows that all analysis intersections are now operating acceptably at LOS A, B or C conditions during the AM and PM peak traffic hours.

D. YEAR 2010 BASE CASE (WITHOUT PROJECT) OPERATING CONDITIONS

Tables 2, 3 and **4** show that all analysis intersections would be operating acceptably at LOS A, B or C conditions during the AM and PM peak traffic hours with year 2010 Base Case (without project) volumes.

IV. FREEWAY SEGMENT LEVEL OF SERVICE

A. Analysis Methodology

Freeway segments have been evaluated using the year 2000 Highway Capacity Manual (HCM) analysis methodology as adjusted by the Santa Clara VTA Congestion Management Program.[1] The HCM method for evaluating LOS of freeway segments is based on density, expressed as passenger cars per mile per lane (pcpmpl). The LOS/density relationships are presented in **Table 5**. The density values for the LOS A/B, B/C and C/D thresholds are based on values from HCM 2000. The LOS D/E and E/F thresholds are based on Santa Clara County conditions and are slightly different from those in the HCM 2000.

B. MINIMUM ACCEPTABLE STANDARDS

1. Santa Clara VTA

The Santa Clara VTA minimum acceptable standard for freeway operation is LOS E.

2. Caltrans

Caltrans' *Guide for the Preparation of Traffic Impacts Studies* (December 2002) is intended to provide a consistent basis for evaluating traffic impacts to state facilities. Caltrans endeavors to maintain a target LOS at the transition between LOS C and LOS D. However, on state highway facilities Caltrans acknowledges that maintenance of the target LOS may not always be feasible and recommends that the lead agency (the VTA) consult with Caltrans to determine the appropriate target LOS.[2]

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[1] *Transportation Impact Analysis Guidelines* (March 29, 2004) and *Traffic Level of Service Analysis Guidelines* (June 2003).

[2] California Department of Transportation, December 2002, *Caltrans Guide for the Preparation of Traffic Impact Studies.*

C. EXISTING OPERATING CONDITIONS

1. S.R.237

Table 6 presents existing freeway densities from the VTA 2006 Monitoring and Conformance Report, while **Table 7** presents corresponding levels of service for S.R.237. As shown, S.R.237 is now operating unacceptably at LOS F during the AM peak hour in the westbound direction between I-880 and N. 1st Street. During the PM peak hour, it is operating unacceptably at LOS F in the eastbound direction between Great America Parkway and Zanker Road, and in the westbound direction between I-880 and Zanker Road.

2. I-880

Table 6 presents existing freeway densities from the VTA 2006 Monitoring and Conformance Report, while **Table 7** presents corresponding levels of service for I-880. As shown, I-880 is now operating unacceptably at LOS F during the PM peak hour in the northbound direction.

D. YEAR 2010 BASE CASE (WITHOUT PROJECT) OPERATING CONDITIONS

1. S.R.237

Table 6 presents year 2010 freeway densities, while **Table 7** presents corresponding levels of service for S.R.237. As shown, S.R.237 would be operating unacceptably at LOS F during the AM peak hour in the westbound direction between I-880 and N. 1st Street. During the PM peak hour, it would be operating at LOS F in the eastbound direction between Great America Parkway and Zanker Road, and in the westbound direction between I-880 and Zanker Road.

2. I-880

Table 6 presents year 2010 freeway densities, while **Table 7** presents corresponding levels of service for I-880. As shown, I-880 would be operating unacceptably at LOS F during the PM peak hour in the northbound direction.

V. PROJECT TRAFFIC IMPACTS

A. IMPACT SIGNIFICANCE CRITERIA

1. Intersections

a. City of San Jose (CMP Intersections at Freeway Ramps)

An impact is considered significant if project traffic degrades LOS A, B, C, D or E operation to LOS F operation.

b. City of Milpitas (Dixon Landing Road/I-880 Ramp Intersections)

An impact is considered significant if project traffic degrades LOS A, B, C or D operation to LOS E or F operation.

c. City of San Jose (Gold Street/Great America Parkway Connector Road Intersection)

An impact is considered significant if project traffic degrades LOS A, B, C or D operation to LOS E or F operation.

2. Freeways

a. Valley Transportation Authority

An impact is considered significant if project traffic degrades LOS A, B, C, D or E operation to LOS F operation. If Base Case operation is already LOS E, the impact is considered significant if project traffic is greater than one percent of the freeway capacity. For two mixed flow lanes, one percent of directional capacity is 44 vehicles per hour.

b. Caltrans

Caltrans considers any traffic added to significantly congested freeway conditions (typically LOS F) as a significant impact.

Discussions with Caltrans and VTA staff did not lead to any conclusions regarding whether the project's traffic impact could be considered short term or temporary in nature. As such, this analysis focuses on the exceedance of established criteria presented above and does not qualify the conclusions based on the duration of construction truck activity.

B. TRIP GENERATION

The District has developed projections of likely construction truck activity for project Alternatives 4 and 5 – see **Table 8**. These alternatives, which would produce the greatest level of truck traffic would be expected to generate 80 round trips per day (or 5 to 10 truck trips per hour per direction) of vegetation-filled trucks and of sediment-filled trucks. For the purposes of the traffic analysis, only peak hour traffic is evaluated. As shown in **Table 8**, during the local street system peak traffic hour (8:00 to 9:00 AM), there would likely be 10 outbound trucks departing for both the Zanker Road landfill (with vegetation) as well as for the Newby Island Landfill accessed via Dixon Landing Road (with sediment). During this same hour there would be five trucks returning to Alviso from each landfill. During the PM peak hour (5:00 to 6:00), there would be 5 trucks departing Alviso for each landfill, with 10 trucks returning to Alviso from each landfill.

Three scenarios have been evaluated regarding where Newby Island Landfill trucks would access the S.R.237 freeway in the Alviso area. They are:

- Scenario 1: All freeway access via the Great America Parkway interchange
- Scenario 2: All freeway access via the N. 1st Street interchange
- Scenario 3: All freeway access via the Zanker Road interchange

Scenario 1 AM and PM peak hour project volumes are presented in **Figures 6** and **7**, Scenario 2 AM and PM peak hour volumes are presented in **Figures 8** and **9**, and Scenario 3 AM and PM peak hour project volumes are presented in **Figures 10** and **11**.

C. YEAR 2010 BASE CASE + PROJECT (ALTERNATIVE 5) INTERSECTION OPERATION

Tables 2, 3 and **4** show that all analysis intersections would be operating at acceptable levels of service (A, B or C) during the AM and PM peak traffic hours, regardless of the interchange utilized by trucks to access the S.R.237 freeway (either Scenario 1, 2 or 3). Project truck traffic during the AM peak hour would increase intersection control delay by no more than 0.3 second at any major intersection utilized. During the PM peak hour, project truck traffic would increase intersection control delay by no more than 0.1 second at any major intersection utilized.

Because intersection LOS would not degrade to LOS E or F, ***this would be a less than significant impact.***

D. YEAR 2010 BASE CASE + PROJECT (ALTERNATIVE 5) FREEWAY OPERATION

1. Scenario 1 (All Trucks To/From Newby Island Landfill Access the S.R.237 Freeway at the Great America Parkway Interchange)

Table 7 shows that project traffic would not degrade AM or PM peak hour LOS A to E operation on the S.R.237 or I-880 freeways to LOS F operation. For those freeway segments experiencing unacceptable LOS F Base Case operation, project traffic would be increasing volumes by less than one percent and would be less than one percent of freeway segment capacity. As such, ***this would be a less than significant impact per VTA standards.***

However, Caltrans considers any truck traffic added to freeway segments with LOS F operation as a significant impact. During the AM peak hour, Alternative 5 would contribute traffic volume to two freeway segments (S.R. 237 – I-880 to Zanker Road and S.R. 237 – Zanker Rd., to N. 1st St., both westbound) with existing LOS F. During the PM peak hour, Alternative 5 would contribute traffic volume to four freeway segments (northbound I-880 between S.R. 237 & Dixon Landing Rd., westbound S.R. 237 – I-880 to Zanker Road, eastbound S.R. 237 – Zanker Rd., to N. 1st St., and eastbound S.R. 237 – N. 1st St. to Great America Parkway) with existing LOS F.

As such, ***this would be a significant impact per Caltrans standards.*** Mitigation to limit construction truck traffic during the peak hours on the above freeway segments would be required to reduce significant impact to a less-than-significant level (see Section VI below).

2. Scenario 2 (All Trucks To/From Newby Island Landfill Access the S.R.237 Freeway at the N. 1st Street Interchange)

Results would be the same as Scenario 1, with the exception that only three, not four freeway segments would receive significant impacts during the PM peak hour according to Caltrans criteria.

This would be a ***less than significant impact per VTA standards.*** This would be a ***significant impact per Caltrans criteria.*** Mitigation to limit construction truck traffic during the peak hours on the above freeway segments would be required to reduce significant impact to a less-than-significant level (see Section VI below).

3. Scenario 3 (All Trucks To/From Newby Island Landfill Access the S.R.237 Freeway at the Zanker Road Interchange)

Results would be the same as Scenario 1, with the exception that only one, not two freeway segments would receive significant impacts during the AM peak hour; and two, not four freeway segments would receive significant impacts during the PM peak hour.

This would be a ***less than significant impact per VTA standards.*** This would be a ***significant impact per Caltrans criteria.*** Mitigation to limit construction truck traffic during the peak hours on the above freeway segments would be required to reduce significant impact to a less-than-significant level (see Section V below).

VI. MITIGATION MEASURES

A. PROJECT FREEWAY IMPACTS (PER CALTRANS CRITERIA)

- Limit all project truck traffic on the S.R.237 and I-880 freeways to between 9:00 AM and 4:30 PM.

Impact reduced to a less than significant level.

VII. CIRCULATION IMPACTS DUE TO ALTERNATIVES 1 TO 4

Alternatives 1 to 4 would generate traffic volumes equal to or less than Alternative 5. As such, intersection LOS impacts discussed for Alternative 5 would be the same for Alternatives 1 through 4, under all three scenarios. Impacts on intersection LOS would therefore be considered less than significant.

Any alternative adding traffic to the S.R.237 or I-880 freeways during the 8:00 to 9:00 AM or 5:00 to 6:00 PM time periods would produce significant freeway segment impacts based upon Caltrans significance criteria. The mitigation measure, described in Section V, would be necessary to reduce significant impacts to less-than-significant levels for Alternatives 1 to 4.

PERSONS CONTACTED:

1. Mr. James Rodriguez, City of Milpitas Traffic Engineer
2. Mr. Lance Hall, Caltrans District 4 Senior Traffic Engineer
3. Mr. Eugene Maeda, Santa Clara Valley Transportation Authority

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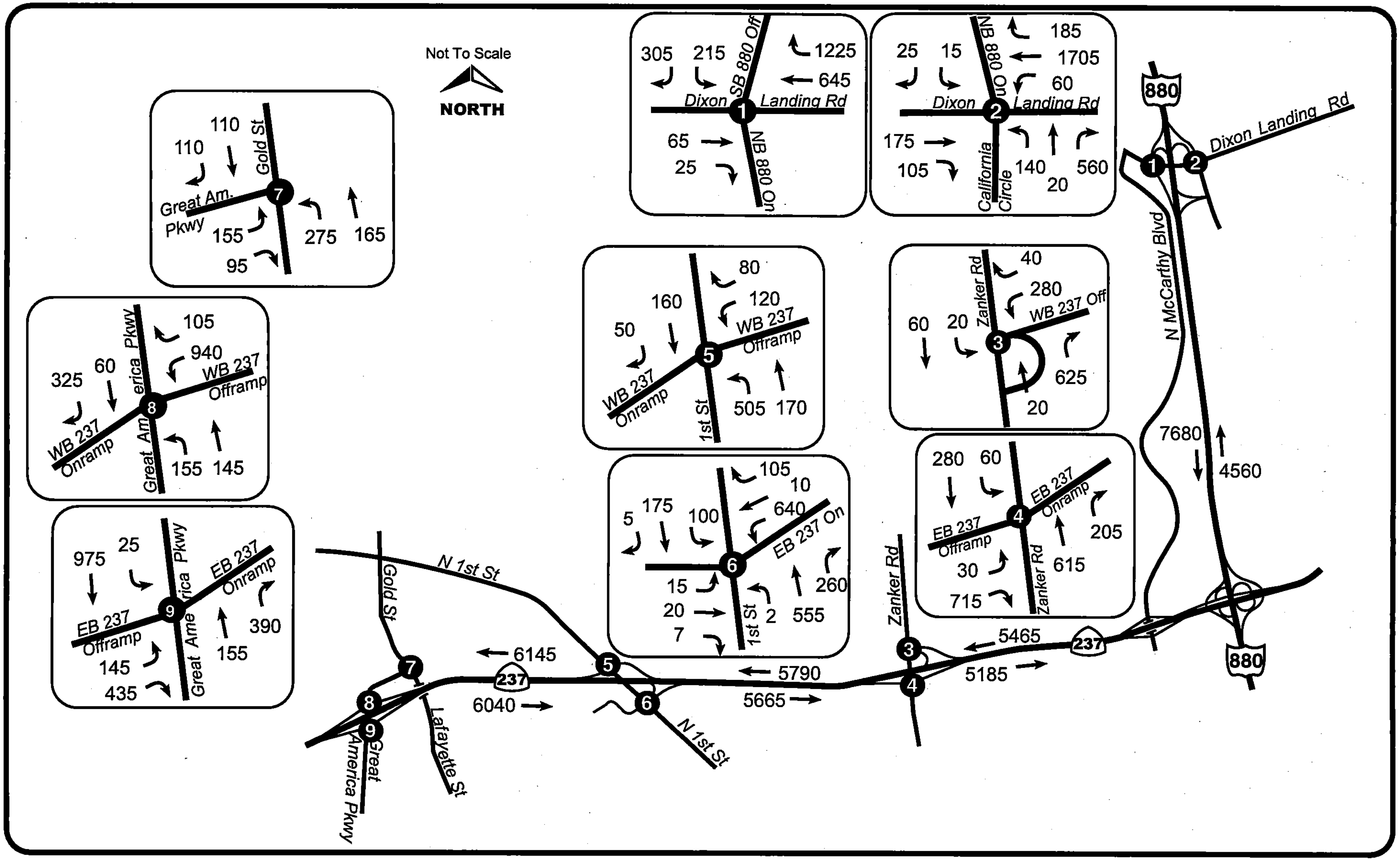

Figure 1

Existing AM Peak Hour Volumes

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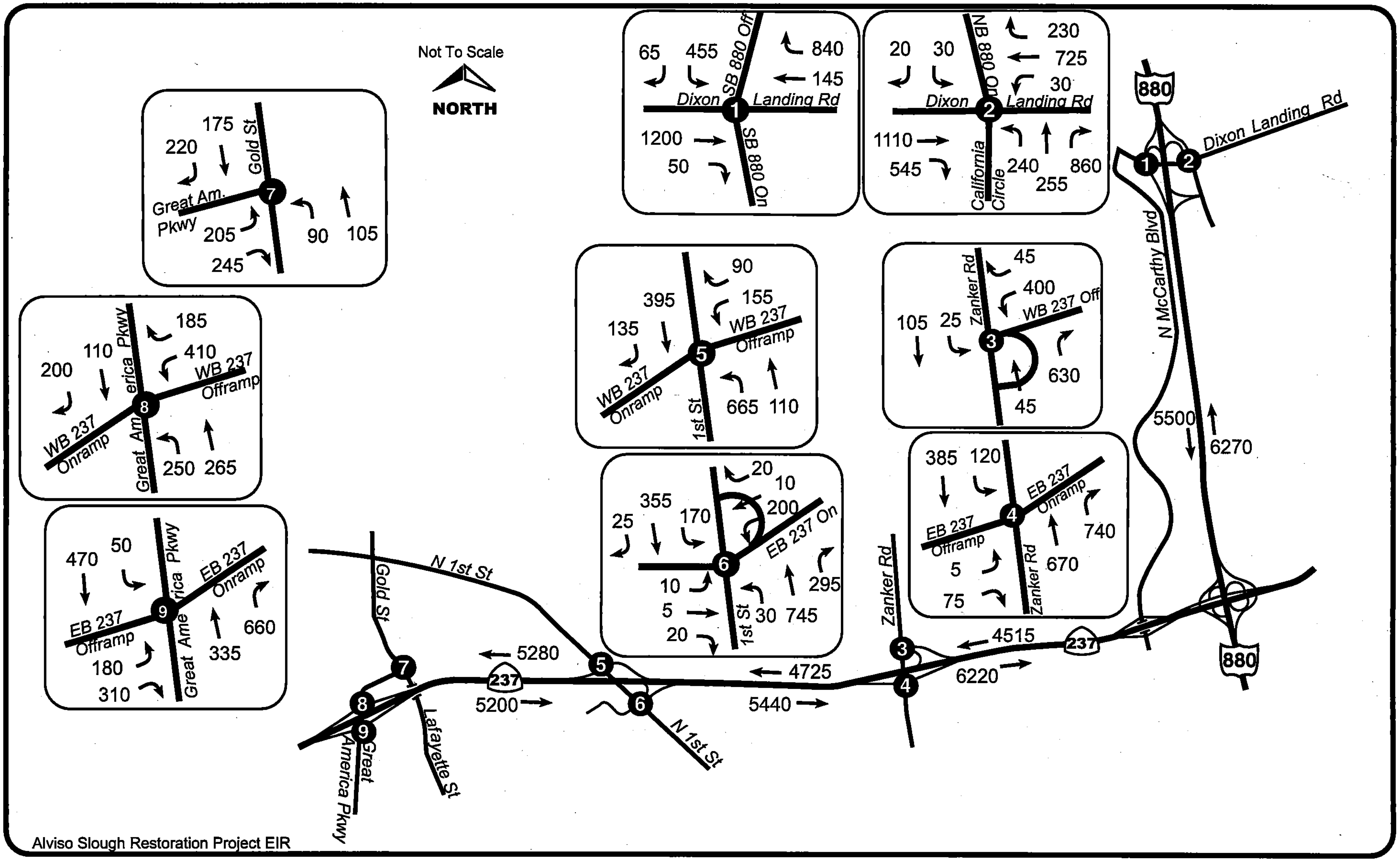

Alviso Slough Restoration Project EIR

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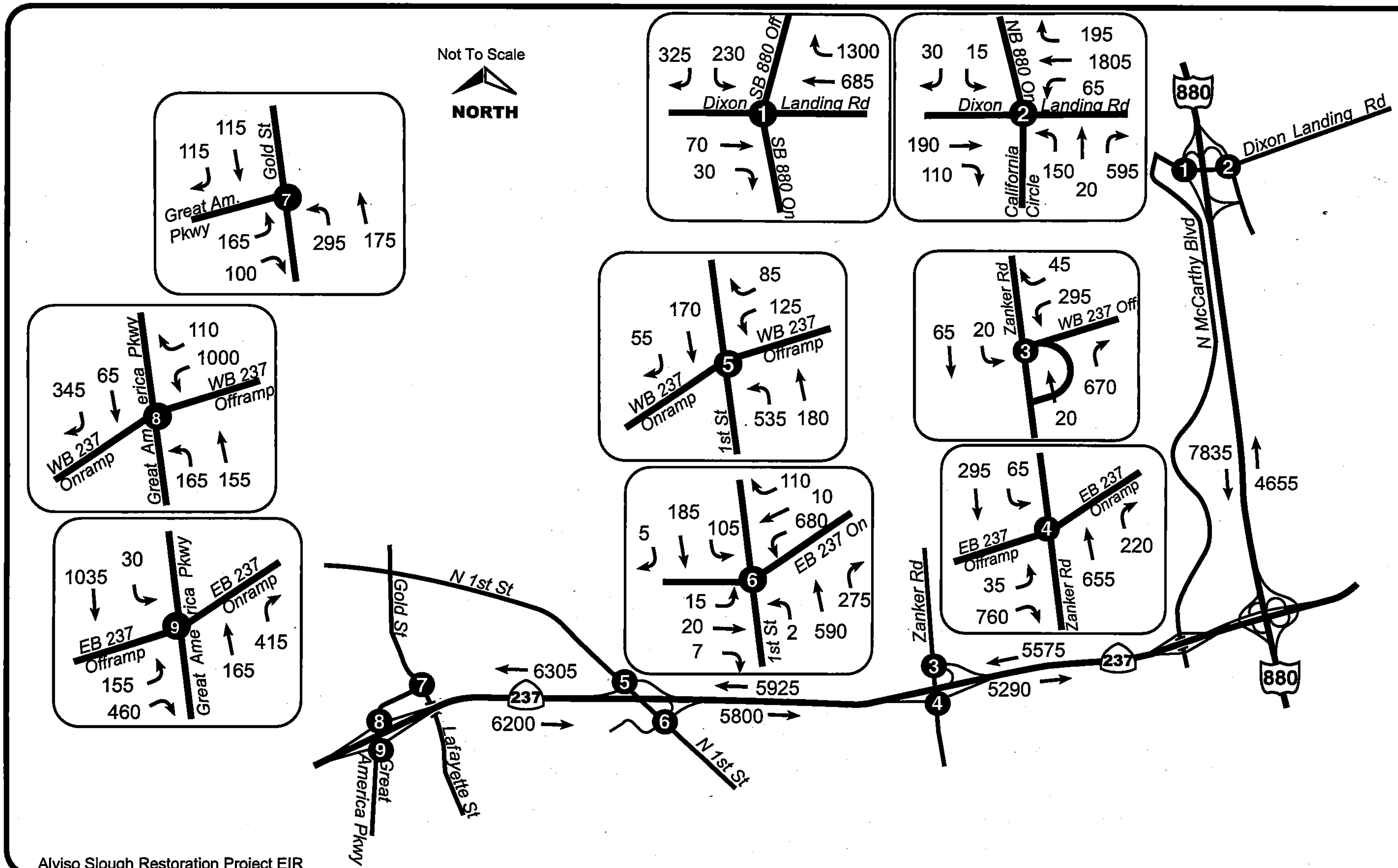
Figure 2

Existing PM Peak Hour Volumes



Alviso Slough Restoration Project EIR

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Figure 3

Year 2010 Base Case (Without Project)
AM Peak Hour Volumes

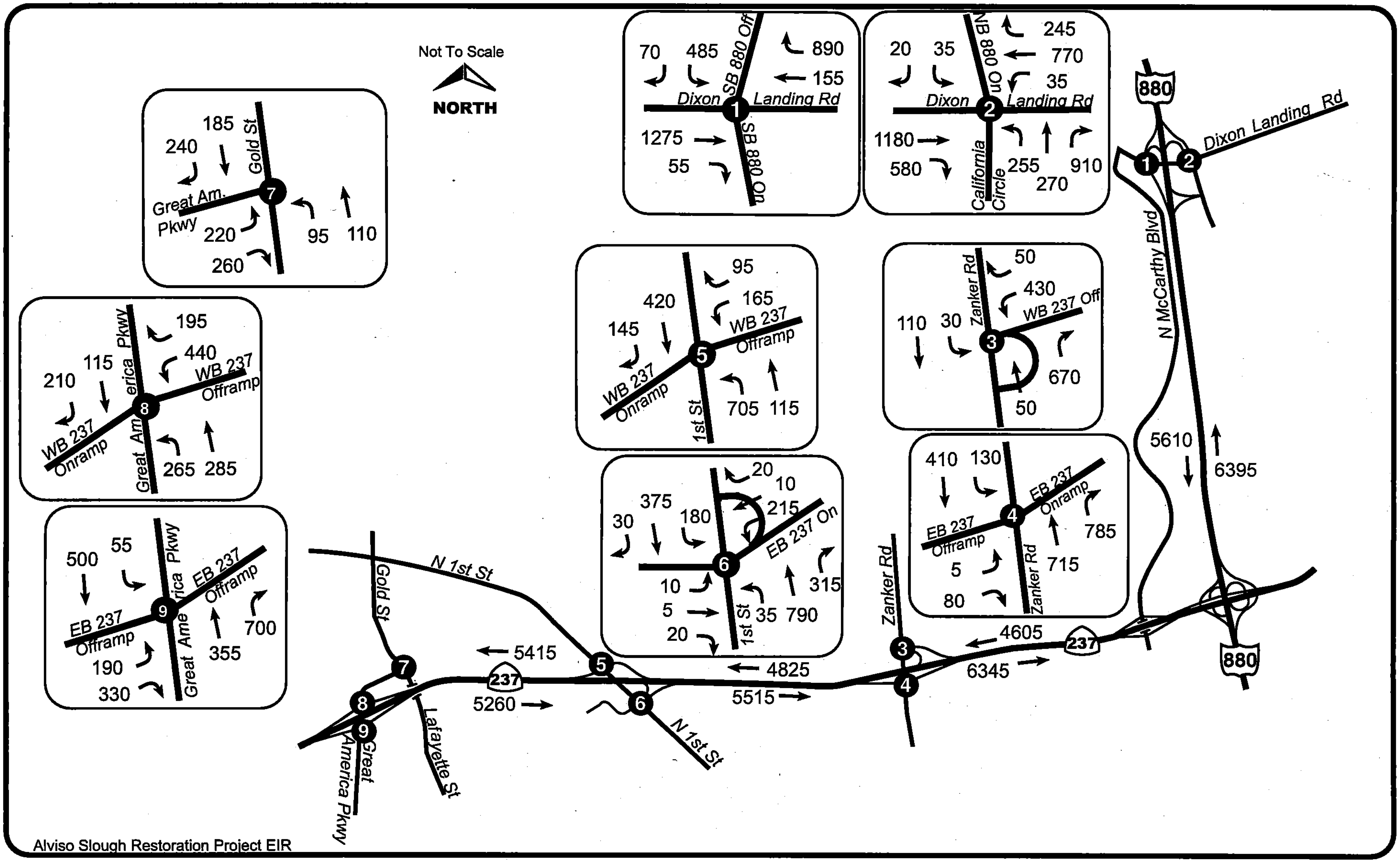

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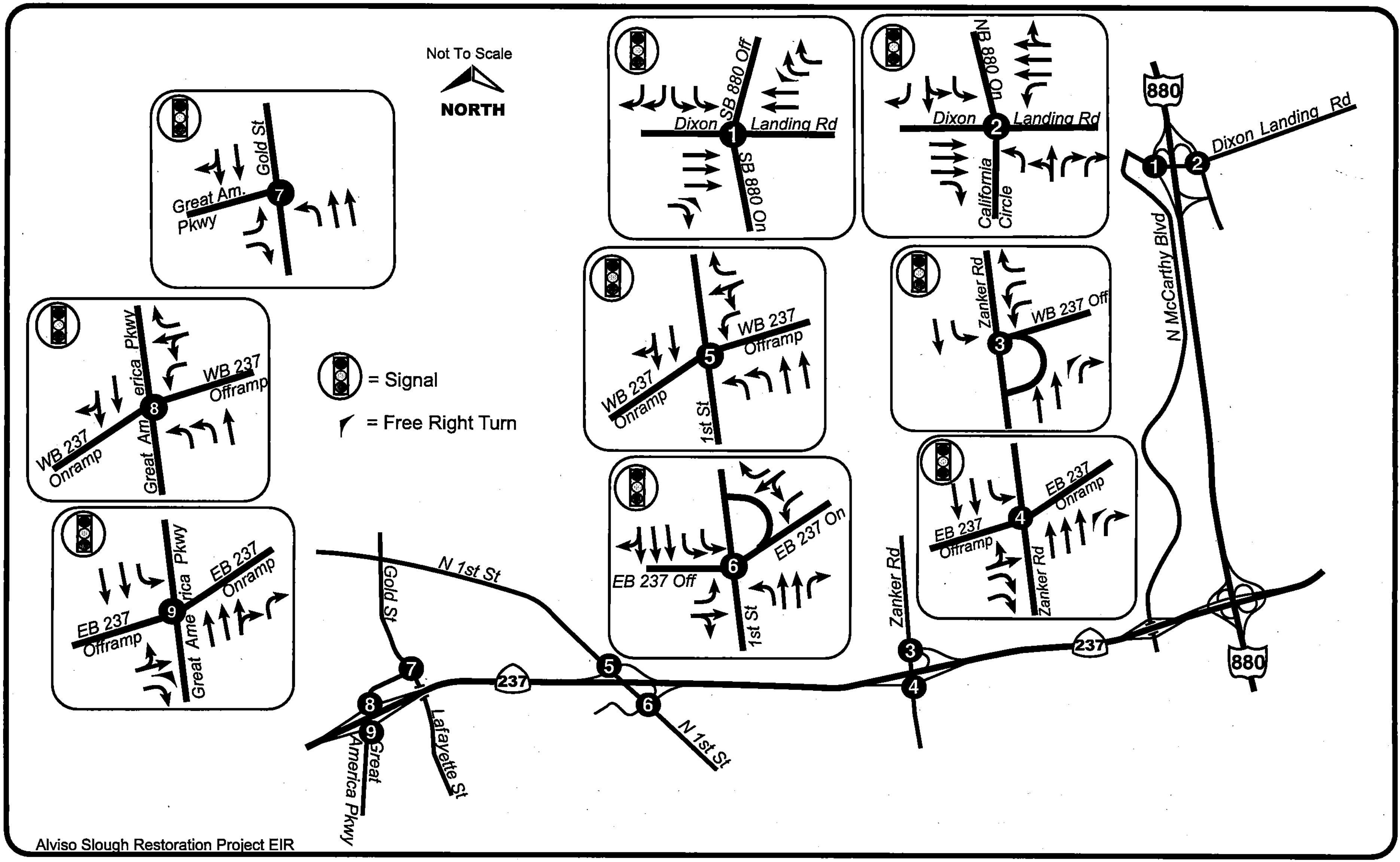
Figure 4

Year 2010 Base Case (Without Project)
PM Peak Hour Volumes



Alviso Slough Restoration Project EIR

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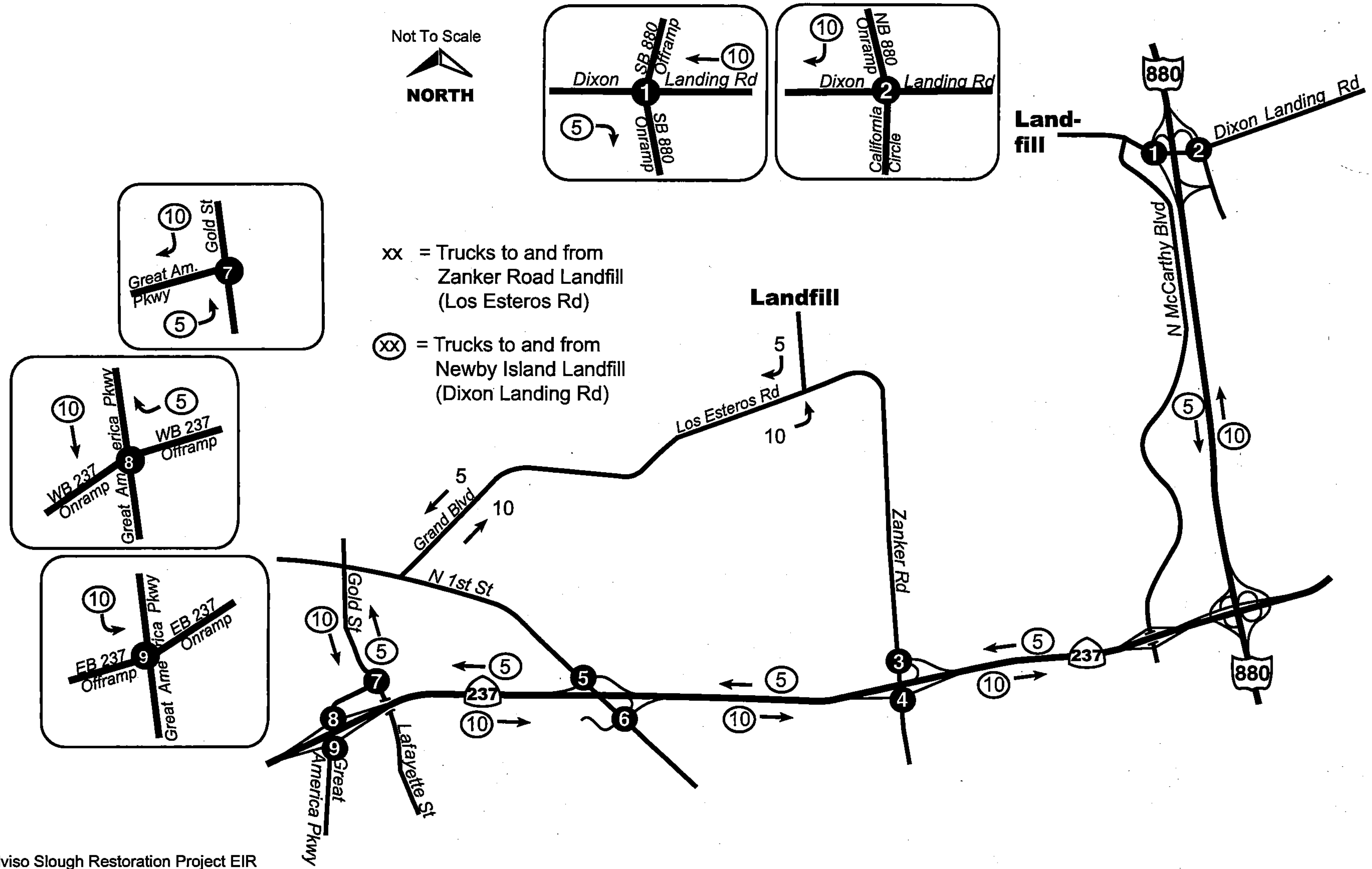
Figure 5

Existing Lane Geometrics and Intersection Control



Alviso Slough Restoration Project EIR

Scenario 1 = Newby Island Landfill Trucks access Freeway at Great American Parkway near Alviso

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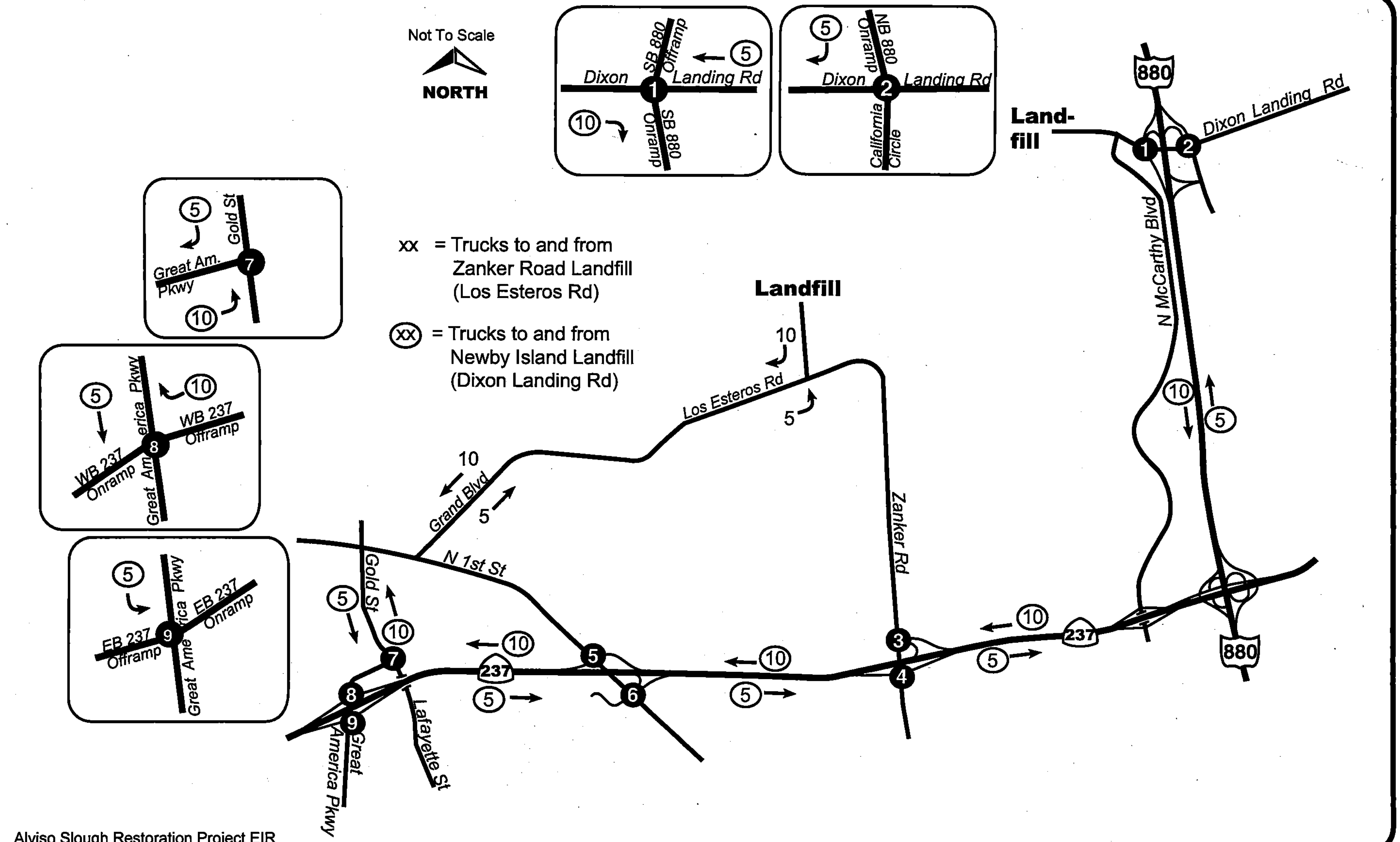
Figure 6

AM Peak Hour Project Increment
Alternative 5 - Scenario 1



Alviso Slough Restoration Project EIR

Scenario 1 = Newby Island Landfill Trucks access Freeway at Great American Parkway near Alviso

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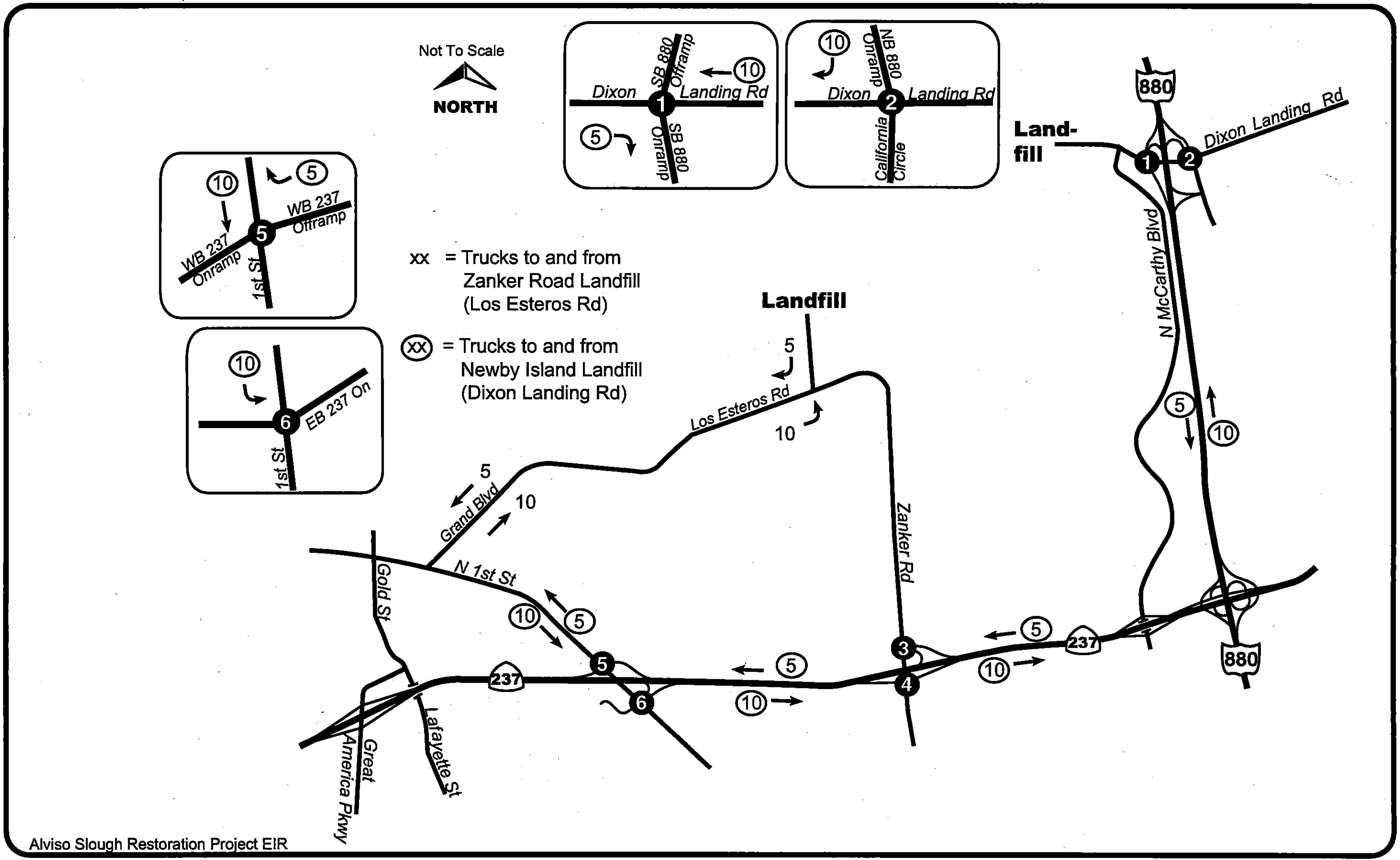
Figure 7

**PM Peak Hour Project Increment
Alternative 5 - Scenario 1**



Alviso Slough Restoration Project EIR

Scenario 2 = Newby Island Landfill Trucks access Freeway at 1st Street

Figure 8

AM Peak Hour Project Increment Alternative 5 - Scenario 2

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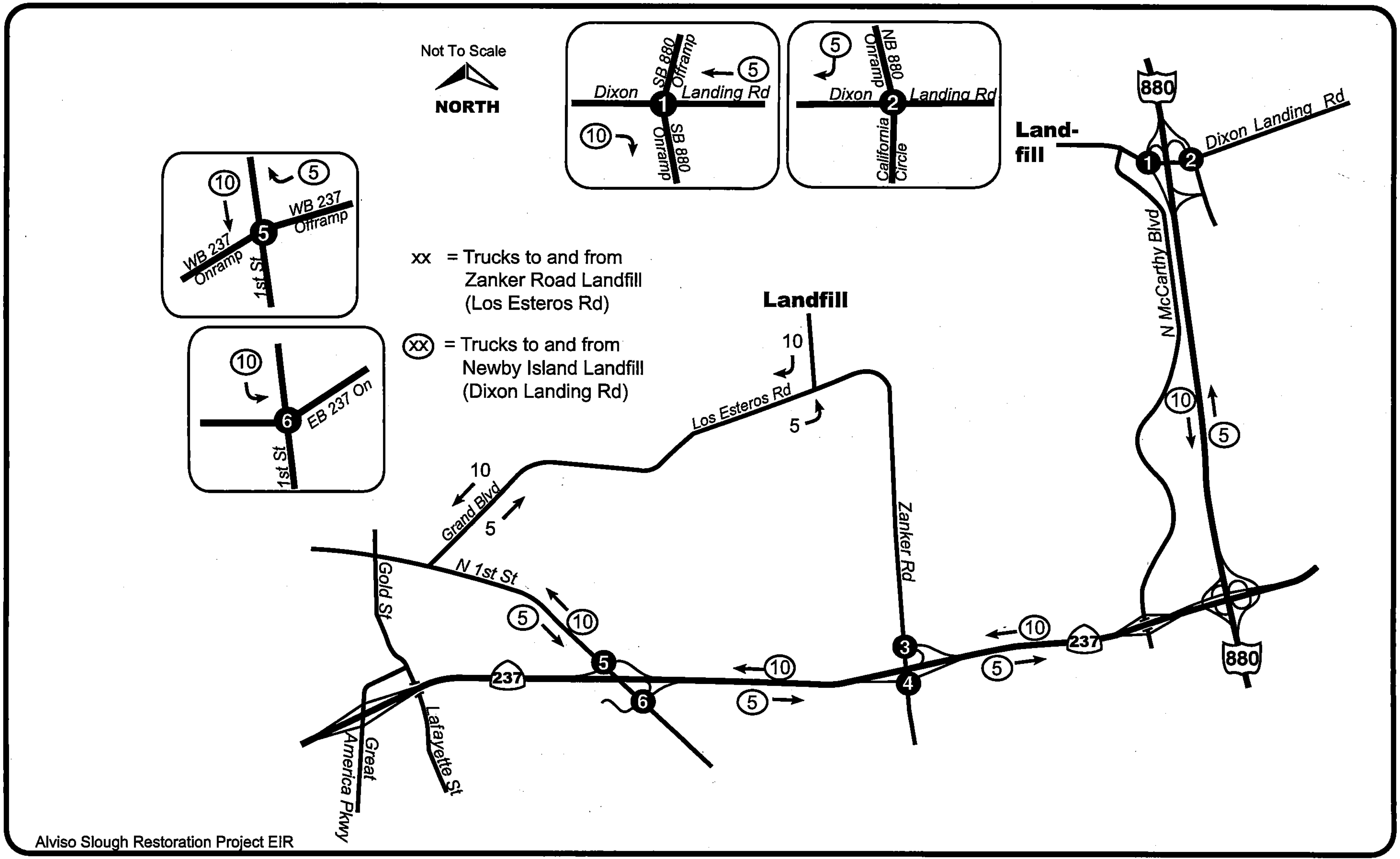

Alviso Slough Restoration Project EIR

Scenario 2 = Newby Island Landfill Trucks access Freeway at 1st Street

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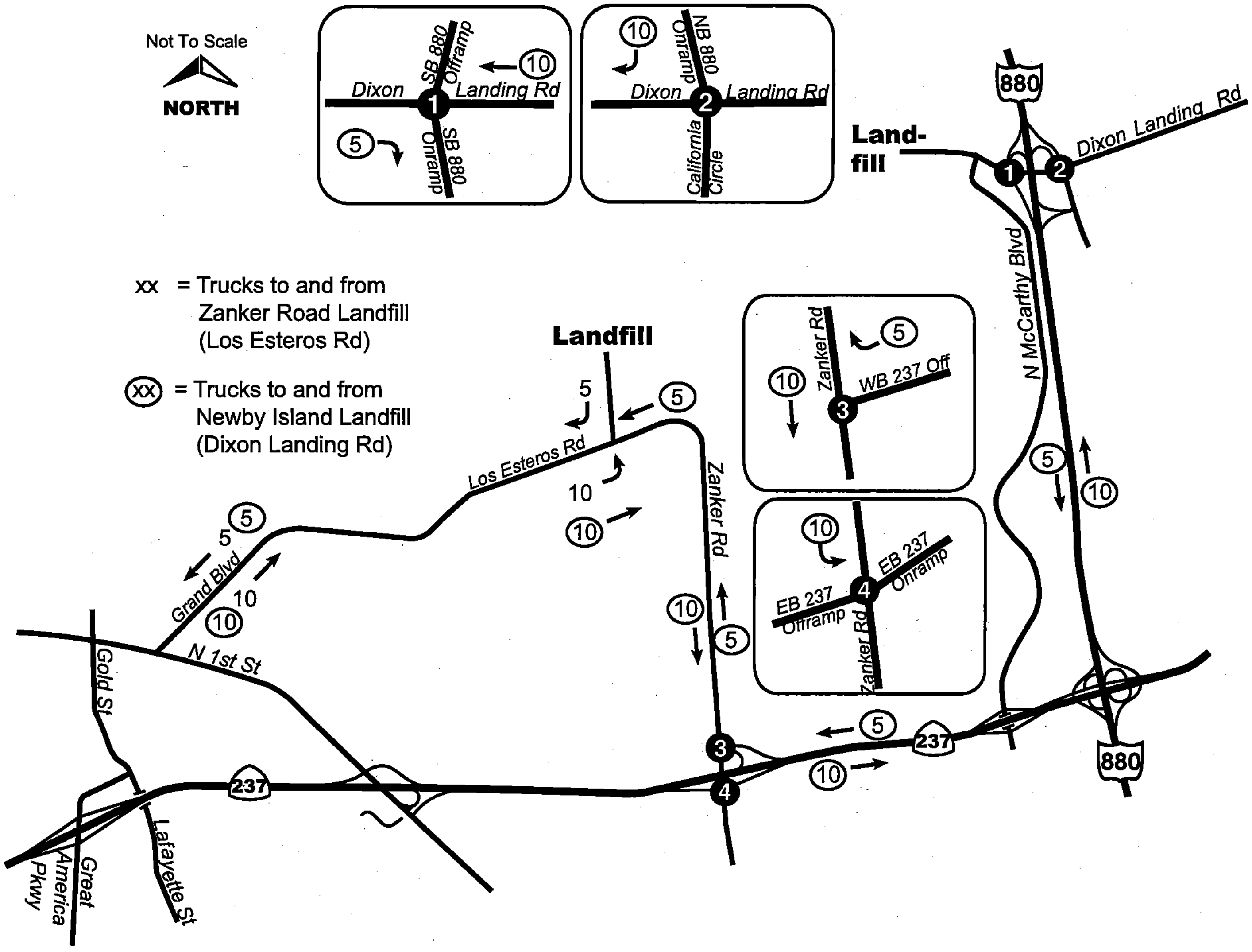
Figure 9

PM Peak Hour Project Increment Alternative 5 - Scenario 2



Alviso Slough Restoration Project EIR

Scenario 3 = Newby Island Landfill Trucks access Freeway at Zanker Road

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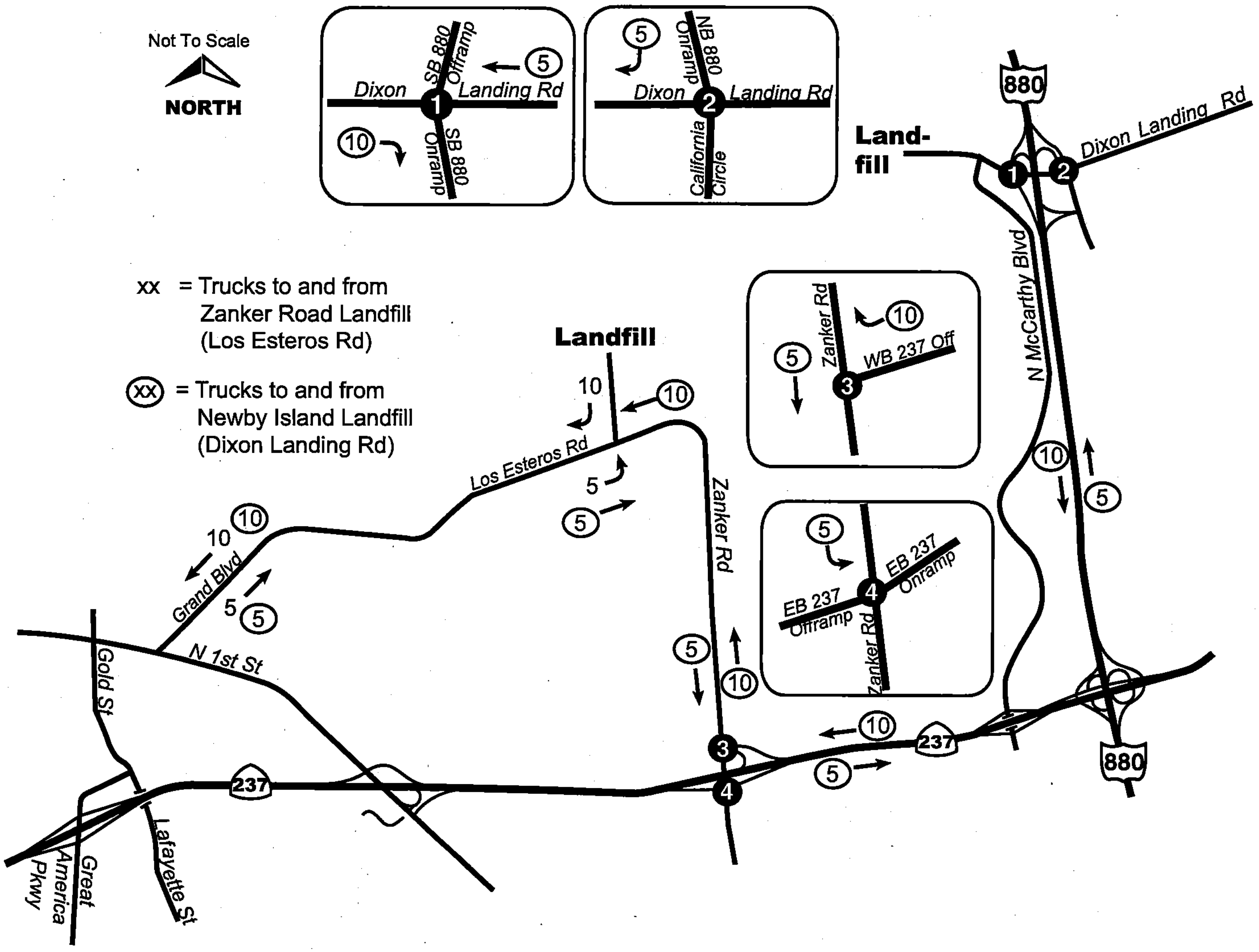
Figure 10

AM Peak Hour Project Increment
Alternative 5 - Scenario 3



Alviso Slough Restoration Project EIR

Scenario 3 = Newby Island Landfill Trucks access Freeway at Zanker Rd

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Figure 11

PM Peak Hour Project Increment
Alternative 5 - Scenario 3

Table 1

SIGNALIZED INTERSECTION LOS CRITERIA

Level of Service	Average Control Delay (Seconds/Vehicle)
A	delay ≤ 10.0
B+ B B-	10.0 < delay ≤ 12.0 12.0 < delay ≤ 18.0 18.0 < delay ≤ 20.0
C+ C C-	20.0 < delay ≤ 23.0 23.0 < delay ≤ 32.0 32.0 < delay ≤ 35.0
D+ D D-	35.0 < delay ≤ 39.0 39.0 < delay ≤ 51.0 51.0 < delay ≤ 55.0
E+ E E-	55.0 < delay ≤ 60.0 60.0 < delay ≤ 75.0 75.0 < delay ≤ 80.0
F	delay > 80.0

Source: Santa Clara Valley Transportation Authority Congestion Management Program – Transportation Impact Analysis Guidelines

Table 2

INTERSECTION LEVEL OF SERVICE
EXISTING & YEAR 2010 (WITH & W/O PROJECT ALT 5)
ALT 5 (SCENARIO 1)
GREAT AMERICA PARKWAY FREEWAY ACCESS

INTERSECTION	AM PEAK HOUR			PM PEAK HOUR		
	EXISTING	BASE CASE	BASE CASE + PROJECT	EXISTING	BASE CASE	BASE CASE + PROJECT
Great America Pkwy/S.R.237 EB Ramps	A 7.5(1)	A 7.6	A 7.6	A 8.1	A 8.2	A 8.3
Great America Pkwy/S.R.237 WB Ramps	B 14.4(1)	B 15.5	B 15.5	B 12.4	B 12.5	B 12.5
Gold St./Great America Pkwy Connector Rd.	B 12.2(1)	B 12.3	B 12.4	B+ 12.0	B 12.1	B 12.1
Dixon Landing Rd./I-880 SB Ramps	B 14.5(1)	B 14.7	B 14.7	B 15.3	B 15.5	B 15.5
Dixon Landing Rd./I-880 NB Ramps/California Circle	B- 19.9(1)	C+ 20.6	C+ 20.9	C+ 22.7	C 24.1	C 24.1

(1) Signalized level of service – average vehicle control delay in seconds.

Year 2000 Highway Capacity Manual Analysis Methodology; TRAFFIX software program with VTA adjustments.
Source: Crane Transportation Group

Table 3

INTERSECTION LEVEL OF SERVICE
EXISTING & YEAR 2010 (WITH & W/O PROJECT ALT 5)
ALT 5 (SCENARIO 2)
NORTH 1st STREET FREEWAY ACCESS

INTERSECTION	AM PEAK HOUR			PM PEAK HOUR		
	EXISTING	BASE CASE	BASE CASE + PROJECT	EXISTING	BASE CASE	BASE CASE + PROJECT
No. 1st St./S.R.237 EB Ramps	B 17.4(1)	B 17.7	B 17.8	B 14.4	B 14.5	B 14.6
No. 1st St./S.R.237 WB Ramps	B 12.6(1)	B 12.7	B 12.9	B 15.6	B 15.9	B 16.1
Dixon Landing Rd./I-880 SB Ramps	B 14.5(1)	B 14.7	B 14.7	B 15.3	B 15.5	B 15.5
Dixon Landing Rd./I-880 NB Ramps/California Circle	B- 19.9(1)	C+ 20.6	C+ 20.9	C+ 22.7	C 24.1	C 24.1

(1) Signalized level of service – average vehicle control delay in seconds.

Year 2000 Highway Capacity Manual Analysis Methodology; TRAFFIX software program with VTA adjustments.
Source: Crane Transportation Group

Table 4

INTERSECTION LEVEL OF SERVICE YEAR 2010 AM & PM PEAK HOURS ALT 5 (SCENARIO 3) ZANKER ROAD FREEWAY ACCESS

INTERSECTION	AM PEAK HOUR			PM PEAK HOUR		
	EXISTING	BASE CASE	BASE CASE + PROJECT	EXISTING	BASE CASE	BASE CASE + PROJECT
Zanker Rd./S.R.237 EB Ramps	B+ 11.7⁽¹⁾	B+ 11.9	B+ 12.0	A 7.4	A 7.5	A 7.6
Zanker Rd./S.R.237 WB Ramps	A 6.7⁽¹⁾	A 6.7	A 6.9	A 7.6	A 7.7	A 7.7
Dixon Landing Rd./I-880 SB Ramps	B 14.5⁽¹⁾	B 14.7	B 14.7	B 15.3	B 15.5	B 15.5
Dixon Landing Rd./I-880 NB Ramps/California Circle	B- 19.9⁽¹⁾	C+ 20.6	C+ 20.9	C+ 22.7	C 24.1	C 24.1

(1) Signalized level of service – average vehicle control delay in seconds.

Year 2000 Highway Capacity Manual Analysis Methodology; TRAFFIX software program with VTA adjustments.
Source: Crane Transportation Group

Table 5

FREEWAY LOS CRITERIA

Level of Service	Density (passenger cars/mile/lane)	Speed (miles/hour)
A	Density ≤ 11.0	67.0 ≤ speed
B	11.0 < density ≤ 18.0	66.5 ≤ speed < 67.0
C	18 < density ≤ 26.0	66.0 ≤ speed < 66.5
D	26 < density ≤ 46.0	46.0 ≤ speed < 66.0
E	46 < density ≤ 58.0	35.0 ≤ speed < 46.0
F	58 < density	Speed < 35.0

Source: Transportation Impact Analysis Guidelines (March 29, 2004) and Traffic Level of Service Analysis Guidelines (June 2003)

Table 6

FREEWAY DENSITIES
EXISTING & YEAR 2010 (WITH & W/O PROJECT ALTERNATIVE 5)

			YEAR 2010							
	EXISTING		BASE CASE		BASE CASE + PROJECT ALT 5 (SCENARIO 1) (GREAT AMERICA PKWY. FREEWAY ACCESS)		BASE CASE + PROJECT ALT 5 (SCENARIO 2) (1ST ST. FREEWAY ACCESS)		BASE CASE + PROJECT ALT 5 (SCENARIO 3) (ZANKER RD. FREEWAY ACCESS)	
LOCATION	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
I-880 Between S.R.237 & Dixon Landing Rd.										
Northbound	35	112	36	114	37	114	37	114	37	114
Southbound	45	23	46	24	46	25	46	25	46	25
S.R.237 – I-880 to Zanker Rd.										
Eastbound	26	42	27	43	29	44	29	44	29	44
Westbound	147	94	150	96	151	98	151	98	151	98
S.R.237 – Zanker Rd. to N. 1st St.										
Eastbound	44	69	45	71	47	72	47	72	45	71
Westbound	64	54	65	55	66	57	66	57	65	55
S.R.237 – N. 1st St. to Great America Pkwy.										
Eastbound	47	94	48	96	50	97	48	96	48	96
Westbound	43	38	44	39	45	41	44	39	44	39

Source: Santa Clara VTA 2006 Monitoring and Conformance Report/Crane Transportation Group

Table 7

FREEWAY SEGMENT LEVEL OF SERVICE EXISTING & YEAR 2010 (WITH & W/O PROJECT ALTERNATIVE 5)

			YEAR 2010							
	EXISTING		BASE CASE		BASE CASE + PROJECT ALT 5 (SCENARIO 1) (GREAT AMERICA PKWY. FREEWAY ACCESS)		BASE CASE + PROJECT ALT 5 (SCENARIO 2) (1ST ST. FREEWAY ACCESS)		BASE CASE + PROJECT ALT 5 (SCENARIO 3) (ZANKER RD. FREEWAY ACCESS)	
LOCATION	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
I-880 Between S.R.237 & Dixon Landing Rd.										
Northbound	D	F	D	F	D	F	D	F	D	F
Southbound	D	C	D	C	D	C	D	C	D	C
S.R.237 – I-880 to Zanker Rd.										
Eastbound	C	D	D	D	D	D	D	D	D	D
Westbound	F	F	F	F	F	F	F	F	F	F
S.R.237 – Zanker Rd. to N. 1st St.										
Eastbound	D	F	D	F	E	F	E	F	NA	NA
Westbound	F	E	F	E	F	E	F	E	NA	NA
S.R.237 – N. 1st St. to Great America Pkwy.										
Eastbound	E	F	E	F	E	F	NA	NA	NA	NA
Westbound	D	D	D	D	D	D	NA	NA	NA	NA

NA = Not applicable; no project truck traffic on these segments.

Source: Santa Clara VTA 2006 Monitoring and Conformance Report/Crane Transportation Group

Table 8

PROJECT TRIP GENERATION

(peak trucking [Alternatives 4 & 5] during limited time when vegetation and sediment trucking is occurring simultaneously)

	ZANKER RD. LANDFILL (VEGETATION)		NEWBY ISLAND LANDFILL (SEDIMENT)		TOTAL PER HALF HOUR
	OUTBOUND (FROM SLOUGH OR STAGING AREAS TO LANDFILL)	RETURNING (FROM LANDFILL TO SLOUGH OR STAGING AREAS)	OUTBOUND (FROM SLOUGH OR STAGING AREAS TO LANDFILL)	RETURNING (FROM LANDFILL TO SLOUGH OR STAGING AREAS)	
8:00-8:30 AM	5		5		10
8:30-9:00	5	5	5	5	20
9:00-9:30	5	5	5	5	20
9:30-10:00	5	5	5	5	20
10:00-10:30	5	5	5	5	20
10:30-11:00	5	5	5	5	20
11:00-11:30	5	5	5	5	20
11:30 AM-12:00 PM		5		5	10
12:00-12:30 PM	Lunch				
12:30-1:00	Lunch				
1:00-1:30	5		5		10
1:30-2:00	5	5	5	5	20
2:00-2:30	5	5	5	5	20
2:30-3:00	5	5	5	5	20
3:00-3:30	5	5	5	5	20
3:30-4:00	5	5	5	5	20
4:00-4:30	5	5	5	5	20
4:30-5:00	5	5	5	5	20
5:00-5:30	5	5	5	5	20
5:30-6:00		5		5	10
TOTAL	***80***	***80***	***80***	***80***	***320***

Source: Project Applicant

Response to Comments

Appendices
I – IV

Appendix I

Minutes of the Public Hearing for the Draft EIR and Draft Engineer's Report (July 16, 2008)

Santa Clara Valley
Water District

BOARD OF DIRECTORS MEETING

MINUTES

SPECIAL MEETING
WEDNESDAY, JULY 16, 2008
7:00 PM

GEORGE MAYNE ELEMENTARY SCHOOL
5030 NORTH FIRST STREET, ALVISO, CA 95002

(Paragraph numbers coincide with agenda item numbers)

I. CALL TO ORDER:

1. Roll Call.

Board members in attendance were T. Estremera, J. Judge, R. Kamei, P. Kwok, S. Sanchez, R. Santos, and L. Wilson, constituting a quorum of the Board.

Staff members in attendance were O. Martin Steele, Chief Executive Officer (CEO), D. Cauble, District Counsel, L. Keller, Clerk/Board of Directors, B. Goldie, S. Judkins, K. Oven, M. Ruiz, and S. Siravo.

II. TIME CERTAIN:

7:05 p.m.

2. Time Open for Public Comment on Any Subject Not on the Agenda.

Chairperson Kamei declared time open for public comment on any subject not on the agenda. There was no one present who wished to speak.

7:10 p.m.

3. Public Hearing on Draft Engineer's Report and Draft Environmental Impact Report (DEIR) for Alviso Slough Restoration Project. (Katherine Oven) (EL-9)

Recommendation: Conduct the public hearing and receive public comments.

Chairperson Kamei welcomed attendees to the Public Hearing on the Draft Engineer's Report and DEIR for the Alviso Slough Restoration Project. She explained the order in which the meeting would be conducted and read the attached statement into the record.

Ms. Katherine Oven, Assistant Operating Officer, reviewed the attached presentation materials.

Chairperson Kamei opened the meeting for comments from the public and read the following speaker cards into the record: from Mr. Don Rumpf, Pin High Golf Center, *I'm strongly in favor of this project*; from Mr. Mark Wells and Mr. Brian Webster, Alviso residents, *I am in favor of clearing the river bed*; from Mr. Rufus Perez, Alviso resident, *It makes more sense to dredge and widen than to waste more money cutting the tulles*; from Mr. Reynaldo Hernandez, Alviso resident, *In favor of clearing tulles from river*; from Mr. Kyle Catanese, Pin High Golf Center, *I support this project*; from Mr. Hugo Villagomez, Alviso resident, *I support this project*; from Ms. Judy Santiago, Alviso resident, *I support the Alviso Slough project*; from Mr. Luis Lujan, Alviso resident, *I support channel restoration for Alviso*; from Ms. Margaret Rose Rangle, Santa Clara resident, *My family and I support this project*; from Ms. Ida Caronado, Santa Clara resident, *I wish to have my name listed as a supporter of this Alviso Slough Project*; from Ms. Debra Laine, Alviso resident, *Has any evaluation been done to see if levees would be compromised and if so, what protection can we expect? I don't want a Mississippi issue. I am 100 percent in favor of clean up and increased access*; from Ms. Rosa Sauceda, Alviso resident, *Local (Alviso) competitive businesses should have top priority in the development of the Alviso Slough Restoration Project;* from Mr. Tony Santos, San Jose resident, *As a prospective Alviso small business owner who seeks to bring jobs and expand revenue in the community, any and all flood control measures are vitally important to me*; from Mr. Peter Lujan, Alviso resident, *I support the Alviso Slough project alternative No. 5*; from Ms. Darlene Smith, Alviso resident, *My family supports the Alviso slough restoration project*; from Ms. Debra Groat, Alviso resident, *I support alternative 5*; from Ms. Selma Herrerra, Alviso resident, *Will the old dock at the end of Catherine Street be included in No. 5? If not, it should be.*

Honorable Dominic Caserta, Santa Clara City Council, expressed support for project alternative No. 5.

Honorable Pete McHugh, Santa Clara County Board of Supervisors, expressed support for project alternative No. 5 and discussed the additional benefits the project would provide for vector control and emergency evacuation.

Mr. Gil Cheso, Allied Waste/Newby Island Landfill, expressed support for project alternative No. 5.

Mr. Eldon Gresham, Alviso business owner, displayed a photo of his business during the 1983 flooding event and reported that water levels rose to seven feet and remained for nine days. He said that additional flooding occurred in 2002, 2004, and 2006; reported the outcomes of resulting litigation against the City of San Jose; and expressed support for project alternative No. 5.

Mr. John Asuncion, Blue Whale Sailing School, expressed support for project alternative No. 5; encouraged the Board to complete all the levees; and encouraged property owners along the slough to fund cleanup of their properties and restore public access.

Mr. Richard Read, Alviso resident, expressed support for project alternative No. 5.

Mr. Sean Michael, Alviso resident, cited the DEIR Page 1, Item 1, *Alviso Slough Review*, and Engineers Report Page 1, Item 1, *Executive Summary*, sections as stating that narrowing of the channel had resulted from vegetation overgrowth, and that navigation and recreation in the slough were impacted by channel realignment. He expressed support for project alternative No. 5.

Mr. Roy Hayes, South Bay Yacht Club (SBYC), reported that SBYC Commodore Russ Robinson was unable to attend the hearing due to illness, and requested that the Board consider Mr. Robinson's written comments. He said that the SBYC looked forward to providing public access to docks as soon as safety issues were resolved; and expressed support for project alternative No. 5.

Mr. Mike Rock, Alviso resident, expressed support for project alternative No. 5.

Mr. Jeff Cristina, Zanker Road Landfill, expressed support for project alterative No. 5.

Mr. Herman Vasquez, La Raza Round Table Executive Director, expressed support for the project.

Mr. Ignacio Perez, Alviso Health Center Chief Financial Officer, expressed support for project alternative No. 5, and requested that the Board consider the overwhelming community support for the project when it considers its final decision.

Mr. Augie Reyes, Alviso resident, expressed support for the project.

Mr. John Schrader, Santa Clara resident, expressed support for the project.

Mr. George Schrader, Santa Clara resident, expressed support for the project and said that it was long overdue.

Mr. Pete Todaro, Santa Clara resident, expressed support for project alternative No. 5.

Mr. Tony Santos, Alviso resident, expressed concern that non-native vegetation growth had resulted from sediment traveling downstream, and alleged that overgrowth had resulted from lack of maintenance. He expressed frustration with the lack of priority given to Alviso flood issues in the past, and with the loss of the ten-year stream maintenance permit; and said that the Alviso community needed to be protected from further flood risk.

Mr. Vern Santos, Alviso resident, encouraged the Board to take action to protect Alviso, as a downstream community of other District projects.

Ms. Rosemarie Azcueta, National Association for the Advancement of Colored People (NAACP) Program Director, informed the Board that she was speaking on behalf of the NAACP Board of Directors. She expressed support for the project; discussed lessons learned during the Hurricane Katrina event; and said that the NAACP was pursuing legislation that would provide additional funding for flood control.

Ms. Christina Fernandez, representing City of San Jose Mayor Chuck Reed, expressed Mayor Reed's regret for his inability to attend and read the attached letter into the record, expressing support for project alternative No. 5.

Ms. Katie Tague, representing Senator Ellen Corbett, expressed Senator Corbett's regret for her inability to attend; thanked the Board for their efforts to date; expressed support for project alternative No. 5; recognized the District's commitment to environmental stewardship; and informed the Board that the office of Senator Corbett was available to assist in support of the project.

Mr. Phillip Nones, San Jose resident, suggested that any of the proposed alternatives would require maintenance, and suggested the harbor should be closer to the bay.

Mr. Mike Flaugher, San Jose resident, expressed support for project alternative No. 5 and said that recreational opportunities would be paramount as population continued to grow.

Ms. Betty Brown, Los Altos resident, said that funding recently approved to resolve Guadalupe River flooding issues did not include the Lower Guadalupe River or Alviso Slough, and expressed support for project alternative No. 5.

Mr. Dewitt Teague, Alviso resident, discussed economic benefits and expressed support for project alternative No. 5.

Mr. Charles Taylor, Alviso resident, expressed support for project alternative No. 5 and discussed the cost to benefit ratio of the proposed project in comparison to other District projects.

Honorable Eddie Sousa, former City of Santa Clara Mayor, said that restoration of the Alviso Slough was long overdue and suggested the Alviso Marina could be part of a bay-wide transportation plan. He discussed the 1983 Alviso flood event and several severe storm events since then; emphasized the need for emergency preparedness; and discussed the benefits of approving a project that includes recreation.

Mr. Jim Canova, Santa Clara Unified School District, discussed the projected growth in North San Jose and expressed support for project alternative No. 5.

Ms. Yesenia Urena, Downtown College Prep student and Alviso resident, discussed her grandparent's experiences with Alviso flooding events and expressed support for the project.

Mr. Gregory Martin, Los Gatos resident, expressed support for project alternative No. 5, and opposition to project alternative No. 6.

Ms. Eileen McLaughlin, Citizens' Committee to Complete the Refuge, said that the DEIR did not recognize the National Wildlife Administration Act; and expressed concern that any of the project alternatives that included lowering the weir should allow ample time for the Department of Fish and Wildlife to evaluate the impacts of increased water flow.

Mr. Willford Santos, Alviso resident, expressed support for the project.

Mr. Ruben Orozco, Alviso resident, discussed his experiences during six Alviso flooding events, including the loss of his home, pets, and personal belongings during the 1983 flood. He said that after the American Red Cross flood victim assistance was insufficient, and that litigation was still pending for many 1983 flood victims. He said that Alviso residents were frustrated with project delays and ongoing neglect, and that project alternative No. 5 was overdue. He suggested that waterway traffic through the slough would decrease sediment build up and reduce maintenance costs; and encouraged the Board to consider the Alviso Marina as an asset to the South Bay area.

Ms. Helen Lozano, Alviso resident, encouraged the Board to consider project alternative No. 5 as a worthwhile investment in the Alviso community.

Ms. Lonnie Gross, Alviso property owner, discussed her participation on various South Bay shoreline commissions, and said that when she joined the Santa Clara Valley Water District Independent Monitoring Committee she was disappointed to see that no Measure B projects were planned in Alviso. She discussed her experiences during several Alviso flooding events; discussed population growth anticipated in North San Jose; and encouraged the Board to consider project alternative No. 5.

Ms. Denise Stephens, South Bay Salt Pond Restoration Project, thanked the Board for holding the public hearing within the Alviso community; discussed the financial impacts of further delay; and expressed support for project alternative No. 5.

Mr. Javier Rodriguez, Alviso resident, cited the cost of the Downtown Guadalupe River Project and encouraged the Board to consider project alternative No. 5 as a matter of public safety.

Mr. Josue Garcia, Building Trades Council, advised the Board that he had also been given authority to speak on behalf of the South Bay Labor Council, and expressed support for restoring safety, economic opportunities, and recreation to Alviso.

Honorable Kansen Chu, San Jose City Council Member, expressed support for the statements made via letter by San Jose City Mayor Reed, and expressed support for project alternative No. 5.

Mr. Harry Adams, representing Assembly Member Sally Lieber, encouraged the Board to pursue a comprehensive, long-term restoration plan and expressed support for project alternative No. 5.

Mr. Mark Roache, Alviso resident, thanked the Board for holding the public hearing in the Alviso community; requested information on how each proposed project alternative meets project objectives; encouraged the Board to pursue only those alternatives that met objectives; and expressed support for project alternative No. 5.

Mr. Doug Bloyd, Santa Clara resident, encouraged the Board to solicit input from the Bay Conservation and Development and State Lands Commissions; expressed support for restoration of the Alviso Slough; and expressed opposition to using public funds to remove boats from the SBYC.

Mr. Paul Lineberry, Zanker Road Resource Management, expressed support for a project alternative that provides the Alviso community with flood control and community enrichment.

Mr. Andrew Ratoemann, Santa Clara Unified School District Board of Directors, stated that Alviso Slough restoration was a regional issue; discussed the potential economic benefits; and expressed support for project alternative No. 5.

Ms. Carmen Montano, Milpitas resident, said that Alviso Slough restoration was overdue; discussed project benefits; and expressed support for project alternative No. 5.

Mr. Bob Gross, former District 3 Director and Alviso property owner, expressed frustration that regulatory agencies were not in attendance; urged the Board to assure stream capacity supported anticipated development; and advocated for restoring the historical connection between the Guadalupe River and Calabazas Creek. He expressed concern that time required to pump water out of Pond A8 was inadequate if two or more storm events occurred within 52 days; and encouraged the Board to consult local environmental experts.

Ms. April Delgado, Alviso resident, said that the City of San Jose had failed to uphold the promises it made when it annexed the Alviso community; and said that residents did not receive a proportionate share of services. She expressed concern about dock safety and vector control; and said that residents would not be bothered by construction noise. She discussed her experience during the 1983 flood event, and said that Federal Emergency Management Association loans were insufficient restitution for damages incurred.

Mr. Jose Arreola, Downtown College Prep, encouraged the Board to support project alternative No. 5.

Mr. Bud LoMonaco, San Jose resident and District Coyote Flood Control and Watershed Advisory Committee (FCWAC) Vice Chairperson, discussed viewing various District projects while attending FCWAC tours, and expressed concern that upstream projects would affect the Alviso community. He said that Slough restoration was overdue, and encouraged the Board to pursue project alternative No. 5.

Mr. Ron Smith, Alviso resident, discussed his experience during the 1983 flood event and encouraged the Board to restore the Slough.

Ms. Lurdes Rivera, Alviso resident and Alviso Water Task Force member, discussed her experience serving on various Alviso flood control task forces and committees; cited that project costs had risen significantly since initial discussions; encouraged the Board to prevent further delays; encouraged the Board to consider the impact of a major flood on North San Jose development and the San Jose Water Treatment Plant; and expressed support for project alternative No. 5.

Chairperson Kamei acknowledged receipt of a speaker card from Mr. James Brown, Alviso resident. Mr. Brown was no longer present to speak.

An anonymous speaker card was submitted to Ms. Lauren Keller, Clerk/Board of Directors, which read: *Please get it done. It's the future.*

Chairperson Kamei acknowledged receiving written comments to the DEIR from Los Altos resident Libby Lucas and Saratoga resident Russ Robinson. She advised members of the public that public comments to the DEIR would be accepted until July 28, 2008; and that the Board anticipated that the Final Environmental Impact Report would be brought to the Board for certification in December 2008 or January 2009.

Chairperson Kamei closed the public hearing and moved the agenda to Item 4.

4. Clerk's Review/Clarification of Requests.

   Ms. Lauren L. Keller, Clerk/Board of Directors, confirmed that there were no new Board member requests resulting from the public hearing.

5. Chairperson Kamei adjourned the meeting at 8:45 p.m., to the next regularly scheduled meeting at 9:30 a.m. on July 22, 2008, in the District Headquarters Building Boardroom, 5700 Almaden Expressway, San Jose, California.

Lauren L. Keller
Clerk/Board of Directors

Approved:

Date:

Appendix II

Best Management Practices List

Appendix II: Best Management Practice (BMPs)

The Santa Clara Valley Water District Best Management Practices (BMP) Handbook, effective date May 22, 2008, includes the following BMPs that would be implemented as part of the Alviso Slough Restoration Project:

Air Quality		
AQ-1	Bay Area Air Quality Management District Basic Dust Control Measures (all construction sites)	Implement Bay Area Air Quality Management District (BAAQMD) Basic Control Measures for construction emissions of PM_{10} at all construction sites. Current measures stipulated by the BAAQMD CEQA Guidelines include the following (BAAQMD 1999): 1. Active areas shall be watered at least twice per day unless soils are already sufficiently moist to avoid dust. The amount of water must be controlled so that runoff from the site does not occur, yet dust control is achieved. 2. Trucks hauling soil, sand, and other loose materials shall be covered or shall maintain at least two feet of freeboard. 3. Unpaved access roads, parking areas and staging areas at construction sites shall be paved, watered three times daily, or non-toxic soil stabilizers shall be applied to control dust generation. 4. Paved site access roads, parking areas, and staging areas shall be swept daily (with vacuum-powered street sweepers). 5. Paved public streets shall be swept (with vacuum-powered street sweepers) if visible soil material is carried onto adjacent paved surfaces.
		Source: BAAQMD CEQA Guidelines
AQ-2	Bay Area Air Quality Management District Enhanced Dust Control Measures (sites greater than 4 acres in size)	For sites greater than four acres in size, implement Bay Area Air Quality Management District Enhanced Dust Control Measures. Current measures stipulated by the BAAQMD CEQA Guidelines include the following (BAAQMD 1999): 1. All BAAQMD "Basic" control measures. 2. Inactive areas (previously graded areas inactive for ten days or more) shall be sprayed with soil stabilizer or seeded. 3. Exposed stockpiles (dirt, sand, etc.) shall be watered twice daily, enclosed, covered, or sprayed with soil stabilizers. 4. Traffic speeds on unpaved roads shall be limited to 15 mph. 5. Sandbags or other bank protections shall be installed to prevent silt runoff to roadways. 6. Vegetation in disturbed areas shall be replanted as soon as horticulturally appropriate. For example, plant material may not be ready as soon as the job is done (e.g. willow cuttings have to be

Air Quality		
		collected during winter dormancy).
		Source: BAAQMD CEQA Guidelines
AQ-3	Bay Area Air Quality Management District Optional Dust Control Measures (Individual optional control measures may be incorporated, as appropriate)	Implement appropriate Bay Area Air Quality Management District (BAAQMD) Optional Control Measures for construction emissions of PM_{10} at all construction sites. BAAQMD Optional Control Measures are strongly encouraged at construction sites that are large in area, located near sensitive receptors, or which for any other reason may warrant additional emissions reductions. Current measures stipulated by the BAAQMD CEQA Guidelines include the following (BAAQMD 1999): 1. Install wheel washers for all exiting trucks, or wash off the tires or tracks of all trucks and equipment leaving the site. 2. Install wind breaks or plant trees/vegetation wind breaks at windward side(s) of construction areas. 3. Suspend excavation and grading activity when winds (instantaneous gusts) exceed 25 mph. 4. Limit the area subject to excavation, grading, and other construction activity at any one time. Additional District control measures that may be used if applicable include: 5. Tailgates of trucks shall be sealed. 6. Trucks shall be brushed down before leaving the site.
		Source: BAAQMD CEQA Guidelines; SMP Provision No. 5.1
AQ-4	Avoid Stockpiling Potentially Odorous Materials	Some sites will have materials that are rich in organic matter decaying in an anaerobic condition, which generates assorted malodorous gases, such as reduced sulfur compounds. These materials will be handled in a manner that avoids impacting sensitive receptors. 1. Avoid stockpiling potentially odorous materials within 1,000 feet of residential areas or other odor sensitive land uses. 2. Where appropriate, odorous stockpiles will be disposed of at an appropriate landfill.
		Source: SMP Provision No. 5.3

Biological Resources		
BI-1	Mitten Crab Control Measures	Sediment from the San Francisco Bay watershed, including that for reuse will not be removed to areas any farther south than Coyote Valley or outside of the San Francisco Bay watershed unless previously authorized by California Department of Fish and Game. This measure is to avoid transporting mitten crabs, a highly invasive, exotic species, to areas where they are not currently found.
		Source: SMP Provision No. 3.4
BI-2	Salvage Native Aquatic Vertebrates	If native aquatic vertebrates are present when cofferdams, water bypass structures, and silt barriers are to be installed, native aquatic vertebrates will be relocated at the discretion of a qualified biologist to ensure that native aquatic vertebrates are not significantly impacted. A site by site evaluation of species present or potentially present and habitat conditions will be made by a qualified biologist. When native aquatic vertebrate relocation efforts are warranted, the operation will be based on the District's Fish Relocation Guidelines.
		Source: SMP Provision No. 3.7
BI-3	Salmonid Protection by In-Channel Work Timing	Avoid and minimize impacts to salmonids by timing projects in streams where there are or could be salmonids so that the use of equipment in the channel is conducted outside of the migration and spawning season. 1. Minor activities that occur above ordinary high water and do not impact the riparian corridor may be done at any time of the year. These activities include fence repair, graffiti removal, revegetation maintenance, rodent control, etc. 2. Minor activities will be done in channel if the activity is necessary to provide immediate flood protection. These activities include removal of trash or debris that will impede flows, trash rack cleaning, and pier nose cleaning. These activities will be done in a manner that is sensitive to protection of aquatic resources.
		Source: SMP Provision No. 3.10
BI-4	Minimize Waterway Access Impacts	Existing access ramps and roads to waterways will be used where possible. If temporary access points are necessary, they will be constructed in a manner that minimizes impacts to waterways: 1. Temporary project access points will be created as close to the work area as possible to minimize running equipment in waterways and will be constructed so as to minimize adverse impacts. 2. Any temporary fill used for access will be removed upon completion of the project. Site topography and geometry will be restored to pre-project conditions to the extent possible.
		Source: SMP Provision No. 2.2
BI-5	Remove Temporary Fills	Temporary fills, such as for diversion structures or cofferdams, will be removed upon finishing the work.

Biological Resources		
	as Appropriate	*Source: SMP Provision No. 3.13*
BI-8	Migratory Bird Surveys	Migratory bird surveys will be performed prior to any project-related activity that could pose the potential to affect migratory birds. Inactive bird nests may be removed, with the exception of raptor nests. No birds, nests with eggs, or nests with hatchlings will be disturbed.
		Source: District Special Provisions Guidelines Article 13.15.01
BI-9	Migratory Bird Nesting Prevention - Vegetation Clearing	Vegetation can be cleared and maintained to prevent migratory bird nesting. All necessary vegetation clearing will be performed prior to the nesting season, if at all possible. No vegetation will be trimmed back unnecessarily, including trees and/or shrubs growing near the right of way, which overhang onto the work site.
		Source: District Special Provisions Guidelines Article 13.15.01
BI-10	Migratory Bird Nesting Exclusion Devices	Nesting exclusion devices may be installed to prevent potential establishment or occurrence of nests in areas where construction activities would occur. All nesting exclusion devices will be maintained throughout the nesting season, or until completion of work in an area makes the devices unnecessary. All exclusion devices will be removed and disposed of when work in the area is complete.
		Source: District Special Provisions Guidelines Article 13.15.01

Cultural Resources		
CU-2	Archaeological Finds	Work in areas where archaeological artifacts are found will be restricted or stopped until proper protocols are met. Work at the location of the find will halt immediately within 30 feet of the find. A Consulting Archaeologist will visit the discovery site as soon as practicable for identification and evaluation pursuant to Section 21083.2 of the Public Resources Code and Section 15126.4 of the California Code of Regulations. If the archaeologist determines that the artifact is not significant, construction may resume. If the archaeologist determines that the artifact is significant, the archaeologist will determine if the artifact can be avoided and, if so, will detail avoidance procedures. If the artifact cannot be avoided, the archaeologist will develop within 48 hours an Action Plan which will include provisions to minimize impacts and, if required, a Data Recovery Plan for recovery of artifacts in accordance with Public Resources Code Section 21083.2 and Section 15126.4 of the CEQA Guidelines.
		Source: District Standard Provision No. 6.28

Cultural Resources		
CU-3	Burial Finds	Work in areas where any burial site is found will be restricted or stopped until proper protocols are met. Upon discovering any burial site as evidenced by human skeletal remains, the County Coroner will be immediately notified. No further excavation or disturbance within 30 feet of the site or any nearby area reasonably suspected to overlie adjacent remains may be made except as authorized by the County Coroner, California Native American Heritage Commission, and/or the County Coordinator of Indian Affairs. *Source: District Standard Provision No. 6.26*

Hazards & Hazardous Materials		
HM-9	Vehicle and Equipment Cleaning	Vehicles will be washed only at the approved area in the corporation yard. No washing of vehicles will occur at job sites. *Source: SMP Provision No. 4.5*
HM-10	Vehicle and Equipment Fueling	No fueling will be done in a waterway or immediate flood plain, unless equipment stationed in these locations is not readily relocated (i.e., pumps, generators). 1. For stationary equipment that must be fueled on-site, containment will be provided in such a manner that any accidental spill of fuel will not be able to enter the water or contaminate sediments that may come in contact with water. 2. Any equipment that is readily moved out of the waterway will not be fueled in the waterway or immediate flood plain. 3. All fueling done at the job site will provide containment to the degree that any spill will be unable to enter any waterway or damage riparian vegetation. *Source: SMP Provision No. 6.4*
HM-11	Vehicle and Equipment Maintenance	No equipment servicing will be done in a stream channel or immediate flood plain, unless equipment stationed in these locations cannot be readily relocated (i.e., pumps, generators). 1. Any equipment that can be readily moved out of the channel will not be serviced in the channel or immediate flood plain. 2. All servicing of equipment done at the job site will provide containment to the degree that any spill will be unable to enter any channel or damage stream vegetation. 3. If emergency repairs are required in the field, only those repairs necessary to move equipment to a more secure location will be done in a channel or flood plain. 4. If emergency repairs are required, containment will be provided

Hazards & Hazardous Materials		
		equivalent to that done for fueling or servicing.
		Source: SMP Provision No. 6.5
HM-12	Hazardous Materials Management	Measures will be implemented to ensure that hazardous materials are properly handled and the quality of water resources is protected by all reasonable means. 1. Prior to entering the work site, all field personnel will know how to respond when toxic materials are discovered. 2. The discharge of any hazardous or non-hazardous waste as defined in Division 2, Subdivision 1, Chapter 2 of the California Code of Regulations will be conducted in accordance with applicable State and federal regulations. 3. In the event of any hazardous material emergencies or spills, personnel will call the Chemical Emergencies/Spills Hotline at 1-800-510-5151.
		Source: SMP Provision No. 6.3
HM-13	Spill Prevention	Prevent the accidental release of chemicals, fuels, lubricants, and non-storm drainage water. 1. Field personnel will be appropriately trained in spill prevention, hazardous material control, and clean-up of accidental spills. 2. No fueling, repair, cleaning, maintenance, or vehicle washing will be performed in a creek channel or in areas at the top of a channel bank that may flow into a creek channel.
		Source: SMP Provision No. 6.1
HM-14	Spill Kit Location	Spill prevention kits appropriate to the hazard will always be in close proximity when using hazardous materials (e.g., crew trucks and other logical locations). 1. Prior to entering the work site, all field personnel will know the location of spill kits on crew trucks and at other locations within District facilities. 2. All field personnel will be advised of these locations and trained in their appropriate use.
		Source: SMP Provision No. 6.2
HM-15	Avoid Exposing Soils with High Mercury Levels	To ensure worker safety is protected in areas with elevated mercury concentrations in exposed surfaces, personal protective equipment will be required during project construction to maintain exposure below levels established by the California Division of Occupational Safety and Health (Cal/OSHA).
		Source: SMP Provision No. 1.10

Hydrology/Water Quality		
WQ-2	Use of Wheel and Track Mounted Vehicles in Stream Bottoms	Field personnel will use the appropriate equipment for the job that minimizes disturbance to the stream bottom. Appropriately-tired vehicles, either tracked or wheeled, will be used depending on the situation. Tracked vehicles (bulldozers, loaders) may cause scarification. Wheeled vehicles may cause compaction. Heavy equipment will not operate in the live stream.
		Source: SMP Provision No. 1.6
WQ-3	Pump/Generator Set Operations and Maintenance	Pumps and generators will be maintained and operated in a manner that minimizes impacts to water quality and aquatic species. 1. Pumps and generators will be maintained according to manufacturers' specifications to regulate flows to prevent dry-back or washout conditions. 2. Pumps will be operated and monitored to prevent low water conditions, which could pump muddy bottom water, or high water conditions, which creates ponding. 3. Pump intakes will be screened to prevent uptake of fish and other vertebrates. 4. Sufficient back-up pumps and generators will be onsite to replace defective or damaged pumps and generators.
		Source: SMP Provision No. 1.7
WQ-4	Handle Sediments so as to Minimize Water Quality Impacts	Sediments will be stored and transported in a manner that minimizes water quality impacts. 1. Wet sediments may be stockpiled outside of a live stream or may be stockpiled within a dewatered stream so water can drain or evaporate before removal. 2. This measure applies to saturated, not damp, sediments and depends upon the availability of a stockpile site. 3. For those stockpiles located outside the channel, water draining from them will not be allowed to flow back into the creek or into local storm drains that enter the creek, unless water quality protection measures recommended by the RWQCB are implemented. 4. Trucks may be lined with an impervious material (e.g. plastic), or the tail gate blocked with dry dirt or hay bales, for example, or trucks may drain excess water by slightly tilting their loads and allowing the water to drain out. 5. Water will not drain directly into channels (outside of the work area) or onto public streets without providing water quality control measures. 6. Streets will be cleared of mud and/or dirt by street sweeping (with a vacuum-powered street sweeper), as necessary, and not by hosing down the street.

Hydrology/Water Quality		
		Source: SMP Provision No. 1.8
WQ-5	Soil Stockpiles	If soil is to be stockpiled, no run-off will be allowed to flow to a creek.
		Source: SMP Provision No. 1.9
WQ-6	Stabilized Construction Entrance	Measures will be implemented to minimize soil from being tracked onto streets near work sites: 1. Methods used to prevent mud from being tracked out of work sites onto roadways include installing a layer of geotextile mat, followed by a 4-inch thick layer of 1 to 3-inch diameter gravel on unsurfaced access roads. 2. Access will be provided as close to the work area as possible, using existing ramps where available and planning work site access so as to minimize disturbance to the water body bed and banks, and the surrounding land uses.
		Source: SMP Provision No. 4.3
WQ-9	Minimize Local Erosion Increase from In-channel Vegetation Removal	In-channel vegetation removal may result in increased local erosion due to increased flow velocity. To minimize the effect, the toe of the bank will be protected by leaving vegetation to the maximum extent practicable consistent with the SMP maintenance guidelines.
		SMP Provision No. 1.16
WQ-11	Tidal Work Areas	For tidal areas, a downstream cofferdam will be constructed to prevent the work area from being inundated by tidal flows. By isolating the work area from tidal flows, water quality impacts are minimized. Downstream flows continue through the work area and through pipes within the cofferdam. 1. Installation of coffer dams will begin at low tide. 2. Waters discharged through tidal coffer dam bypass pipes will not exceed 50 NTU over the background levels of the tidal waters into which they are discharged. 3. Coffer dams in tidal areas may be made from earthen material. If earth is used, the downstream and upstream faces will be covered by a protected covering (e.g., plastic or fabric) if needed to minimize erosion.
		Source: SMP Provision No. 1.2

WQ-18	Site Maintenance and Cleanup	The work site, areas adjacent to the work site, and access roads will be maintained in an orderly condition, free and clear from debris and discarded materials. Personnel will not sweep, grade, or flush surplus materials, rubbish, debris, or dust into storm drains or waterways. Upon completion of work, all building materials, debris, unused materials, concrete forms, and other construction-related materials will be removed from the work site.
		Source: District Special Provisions Guidelines Article 15.09
WQ-29	Discharge Storm Drain Curb & Drop Inlet Protection	To install temporary devices around drain inlets using gravel, wire mesh, and /or concrete blocks that may prevent sediment-laden runoff from entering the storm drain system or watercourses (These devices reduce the velocity of runoff, allowing sediments to settle. The gravel can also filter out coarse sediment from runoff.): 1. Use drain inlet protection in appropriate locations: a. Use in drainage areas less than one acre. b. Place anywhere sediment-laden runoff could discharge into a storm drain inlet. c. If the inlet protection device could pond water, install only where ponded water will not contact materials, flood structures, or cause a nuisance. d. Completely cover inlet where work activities could result in vegetation, raw materials or sediment being deposited into the inlet, or when a small spill occurs near the inlet. Cover inlets with rubber or polyurethane mats, or plastic sheeting anchored with gravel bags. 2. Install inlet protection properly: a. To prevent seepage of sediment-laden runoff into he drain inlet, install drain inlet protection so there are no gaps around the drain inlet. b. Do not place filter fabric over the inlet grate as it can become clogged with sediment and contribute to flooding. 3. Gravel and Wire Mesh Drop Inlet Protection: a. Place wire mesh over the inlet so the wire extends a minimum of 12 inches beyond each side of the inlet structure. Use hardware cloth or comparable wire mesh with ½-inch openings. If more than one mesh strip is required, overlap the strips. b. Pile ¾ to 3-inch washed gravel on top of the mesh surrounding the inlet to a minimum depth of 12 inches. Extend the gravel at least 18 inches beyond the inlet on all sides. 4. Gravel and Wire Mesh Curb Inlet Protection: a. Place wire mesh over the inlet so the wire extends a minimum

of 12 inches beyond each side of the inlet structure. Use hardware cloth or comparable wire mesh with ½-inch openings.

   b. Pile ¾ to 3-inch washed gravel against the mesh to anchor it against the gutter and inlet cover and to surround the inlet completely.

5. Block and Gravel Curb Inlet Protection:
   a. Place two concrete blocks on their sides abutting the curb at either side of the inlet opening. These are the space blocks.
   b. Place a 2-inch by 4-inch stud through the outer holes of each spacer block to align the front blocks.
   c. Place more concrete blocks on their sides across the front of the inlet and abutting the spacer blocks. Do not use mortar.
   d. Place wire mesh with ½-inch openings over the outside vertical face of the blocks to keep gravel out of the inlet.
   e. Place ¾ to 3-inch washed gravel against the wire mesh to the top of the blocks, on slopes of 2:1 or flatter.
6. Block and Gravel Drop Inlet Protection:
   a. Place wire mesh over the inlet so the wire extends a minimum of 12 inches beyond each side of the inlet structure. Use hardware cloth or comparable wire mesh with ½-inch openings. If more than one mesh strip is required, overlap the strips.
   b. Place concrete blocks lengthwise on their sides in a single row around the perimeter of the inlet, so the open end face outward not upward. Abut the ends of the adjacent blocks.
   c. Stack blocks to at least 12 inches but not more than 24 inches above the inlet, depending on design requirements.
   d. Place wire mesh with ½-inch openings over the outside vertical face of the blocks to keep gravel out of the inlet.
   e. Place ¾ to 3-inch washed gravel against the wire mesh to the top of the blocks, on slopes of 2:1 or flatter.
7. Gravel Bag Barriers:
   a. Use bags made of geotextile fabric, not burlap. Fill bags with washed ¾-inch rock or ¼-inch pea gravel.
   b. Place gravel bags around the perimeter of the drop inlet, packing bags together tightly. For a cub inlet, abut the curb at either side of the inlet opening.
   c. If additional flow retention is required, construct a barrier upgradient of the inlet by placing gravel bags perpendicular to the direction of flow. Overlap the bags and pack them tightly together. Construct each barrier using several layers of bags. Leave a one bag gap on the top row to act as a spillway to prevent flooding. If more than one barrier is used, place

		barriers at 20-foot intervals. 8. Wooden Weir (and Fabric) Curb Inlet Protection: a. Construct a wooden weir using 2-inch by 4-inch construction grade lumber, with a total length equal to the throat length plus 2 feet. b. Attach a continuous piece of wire mesh of at least 30 inches in width and a length equal to the inlet's throat length plus 4 feet. c. Place a piece of approved "extra strength" filter cloth, equal to the dimensions of the wire mesh, over the mesh and secure it to the weir. d. Nail the weir to the 9-inch long vertical spacers, which will be located between the weir and the inlet face at no more than 6-foot intervals. e. Place the assembly against the inlet throat and nail 2-inch by 4-inch boards, in minimum lengths of 2 feet, to the top of the weir at the spacers. Extend these anchors across the inlet tops and hold them in place by sandbags or alternate weight. f. Place the assembly such that the end spacers are at lest 1 foot beyond both ends of the throat opening. g. Form the mesh and cloth to the concrete gutter and against the face of the curb on both sides of the inlet. Place coarse aggregate over the mesh and cloth so that water is prevented from entering the inlet either under or around the filter fabric. 9. Inspection and Maintenance: a. Let ponded water evaporate provided it does not cause a nuisance. b. Inspect before anticipated storms and after storms for gaps, clogging of gravel, ruptured gravel bags, and sediment accumulated behind inlet protection. During extended rainfall events, inspect at least once every 24 hours. c. Carefully remove accumulated sediment when the depth reaches half the height of the inlet protection device. Dispose of sediment properly. d. Clean or replace gravel that is clogged with sediment. Do not clean gravel near the inlet.
		Source: Water Utility Discharge Pollution Prevention Plan BMP CM-E
WQ-30	Discharging to Sanitary Sewer System	To prevent sediments from entering local creeks and the bay by removing pollutants in the wastewater treatment processes: 1. Obtain necessary approval from wastewater treatment plant or sanitary sewer agency: a. Obtain approval or permit for a one-time discharge, or b. Obtain approval or permit for annual or ongoing discharge.

2. Design Considerations:
    a. Determine the feasibility of implementing this control measure by identifying access to a sanitary manhole near the discharge location.
    b. Construct discharge system with an air gap between the outlet pipe of the discharge line and the sewerage. If an adequate air gap cannot be maintained at all times to prevent cross contamination, select another control measure.
    c. Develop adequate traffic control plan and implement it prior to the discharge operation. Typically, sanitary sewer manholes are located in traffic lanes. Discharging to these manholes will cause a disruption of the vehicular traffic flow.
    d. Obtain a confined-space entry permit if it is necessary to enter a manhole.
3. Construction Specifications:
    a. Maintain flow within the limits that are acceptable to the local sanitary sewer agencies.
    b. Direct the discharge water to the sanitary sewer system by fixed piping, flexible piping, or a system to capture surface flow discharging (e.g. sand bags).
    c. Install the piping outlet above the manhole at height of at least twice the diameter of the outlet pipe.
    d. Anchor the piping such that the energy from the discharge water will not cause the piping to thrust out of position.
4. Inspection and Maintenance:
    a. Check for leaks from the piping system.
    b. Observe the system in operation and make repairs as required to keep the discharge flowing into the sanitary sewer system.
    c. Ensure that the air gap is maintained at all times.
    d. Observe the water quality and record on a discharge activity checklist.
    e. Monitor the flow of the discharge and record on a discharge activity checklist.
    f. If the wastewater treatment plant or sanitary sewer agency has dictated water quality requirements, monitor accordingly.
    g. After the discharge has ended, remove pipe from sanitary manhole.
    h. Complete a discharge activity checklist and send to your unit supervisor. Include any water quality monitoring results and control measure evaluations on the checklist.
    i. Unit supervisors will prepare a monthly inventory of discharges and send it (along with discharge activity

		checklists) to the Countywide Watershed Programs Unit. j. Notify wastewater treatment plant or sanitary sewer agency that the discharge has ceased.
		Source: Water Utility Discharge Pollution Prevention Plan BMP CM-A
WQ-40	Water Pollution Control	Oily, greasy, or sediment laden substances or other material that originate from the project operations and may degrade the quality of surface water or adversely affect aquatic life, fish, or wildlife will not be allowed to enter, or be placed where they may later enter, any waterway. The project will not increase the turbidity of any watercourse flowing past the construction site by taking all necessary precautions to limit the increase in turbidity as follows: 1. where natural turbidity is between 0 and 50 Nephelometric Turbidity Units (NTU), increases will not exceed 5 percent; 2. where natural turbidity is greater than 50 NTU, increases will not exceed 10 percent; 3. where the receiving water body is a dry creek bed or storm drain, waters in excess of 50 NTU will not be discharged from the project. Water turbidity changes will be monitored. The discharge water measurements will be made at the point where the discharge water exits the water control system for tidal sites and 100 feet downstream of the discharge point for non-tidal sites. Natural watercourse turbidity measurements will be made in the receiving water 100 feet upstream of the discharge site. Natural watercourse turbidity measurements will be made prior to initiation of project discharges, preferably at least 2 days prior to commencement of operations.
		Source: District Special Provisions Guidelines Article 15.01
WQ-41	Stormwater Pollution Prevention	Suitable erosion control, sediment control, source control, treatment control, material management, and non-stormwater management BMPs will be implemented consistent with the latest edition of the California Stormwater Quality Association "Stormwater Best Management Practices Handbook," which is available at www.cabmphandbooks.com.
		Source: District Special Provisions Guidelines Article 16.01

Noise		
NO-1	Noise Pollution	Noise produced by construction activities will not exceed the applicable local noise ordinance standards.
		Source: District Special Provisions Guidelines Article 15.02.01
NO-2	Residential Noise Management	The District will implement practices that minimize disturbances to residential neighborhoods surrounding work sites.

Noise		
		1. In general, work will be conducted during normal working hours. Extending weekday hours and working weekends may be necessary to complete some projects. 2. Internal combustion engines will be equipped with adequate mufflers. 3. Excessive idling of vehicles will be prohibited. 4. All construction equipment will be equipped with manufacture's standard noise control devices. 5. The arrival and departure of trucks hauling material will be limited to the hours of construction. 6. The use of jake brakes is prohibited in residential areas.
		Source: SMP Provision No. 4.2

Transportation/Traffic		
TR-1	Public Safety Measures	Fences, barriers, lights, flagging, guards, and signs will be installed as determined appropriate by the public agency having jurisdiction, to give adequate warning to the public of the construction and of any dangerous condition to be encountered as a result thereof.
		Source: District Standard Provision No. 6.09

Utilities/Service Systems		
UT-1	Sanitary/Septic Waste Management	Temporary sanitary facilities will be located on jobs that last multiple days in compliance with California Division of Occupational Safety and Health (Cal/OSHA) regulation 8 CCR 1526. All temporary sanitary facilities will be placed outside of the creek channel and flood plain and removed when no longer necessary.
		Source: SMP Provision No. 4.4

Appendix III

Legacy Mercury Concentrations in Alviso Slough

Table 2. Sediment Mercury Species Concentration

The deviation of n = 2 samples, when assayed, is given in parentheses ( ), and the type of replication is indicated by the cell color, where blue cells indicate analytical duplicates from the same sub-sample vial and green cell indicate sub-sample duplicates from the original core (separate vials) taken at the time of initial core processing. Profile averages (mean ± standard deviation) of mercury species concentrations are given in bold, with data weighted by depth interval width. Summary statistics for the complete data set are given at the bottom of the Table. [THg, total mercury; Hg(II)R, reactive mercury; MeHg, methylmercury; cm, centimeters; µg/g, micrograms per gram sediment (dry weight); ng/g, nanograms per gram sediment (dry weight); <, less than given detection limit; %, percentage of total mercury; NS, no sample collected].

Site ID and Core[1]	Field: Depth interval[2] (cm)	Core: Depth Interval[3] (cm)	THg (µg/g)		$Hg(II)_R$ (ng/g)		MeHg (ng/g)		$Hg(II)_R$ (%)	MeHg (%)
AS T1 A-D1	0-20	0-20	1.17		0.75		2.34		0.06	0.20
AS T1 A-D1	20-46	20-46	0.54		0.28		1.80		0.05	0.34
AS T1 A-D2	50-69	0-19	1.03	[redacted]	0.56		1.33		0.05	0.13
AS T1 A-D2	69-88	19-38	0.80		0.25		0.50		0.03	0.06
AS T1 A-D2	88-107	38-57	0.65		0.25		0.61		0.04	0.09
AS T1 A-D2	107-126	57-76	0.68		0.18		0.99		0.03	0.15
AS T1 A-D3	126-145	1-20	1.32		0.22		< 0.35		0.02	< 0.03
AS T1 A-D3	145-165	20-40	0.99		0.18		0.68		0.02	0.07
AS T1 A-D3	165-185	40-60	1.39		0.16		0.57		0.01	0.04
AS T1 A-D3	185-203	60-77.5	1.34		0.22		0.94		0.02	0.07
AS T1 A	**MEAN ±**	**(std. dev.)**	**0.98**	**(0.31)**	**0.31**	**(0.19)**	**1.04**	**(0.66)**	**0.03**	**0.11**
AS T1 B-D1	0-20	0-20	0.56		0.29		1.24		0.05	0.22
AS T1 B-D1	20-40	20-40	0.47		0.46		1.39		0.10	0.30
AS T1 B-D1	40-60	40-60	0.54		0.52		0.89		0.10	0.17
AS T1 B-D1	60-83	60-83	0.61	[redacted]	0.47	[redacted]	0.90	[redacted]	0.08	0.15
AS T1 B-D2	83-100	33-50	0.51	[redacted]	0.62		0.68		0.12	0.14
AS T1 B-D2	100-117	50-67	0.66		0.33		0.89		0.05	0.13
AS T1 B-D2	117-135	67-84.5	0.80		0.58		0.83		0.07	0.10
AS T1 B-D3	135-152	5-22	0.96		0.43		2.21		0.04	0.23

Site ID and Core^1	**Field: Depth interval^2 (cm)**	**Core: Depth Interval^3 (cm)**	**THg (µg/g)**		**$Hg(II)_R$ (ng/g)**		**MeHg (ng/g)**		**$Hg(II)_R$ (%)**	**MeHg (%)**
AS T1 B-D3	152-180	22-50	0.84	[redacted]	0.11		1.10		0.01	0.13
AS T1 B-D3	180-209	50-78.5	1.13		0.17		0.62		0.02	0.06
AS T1 B	**MEAN ±**	**(std. dev.)**	**0.73**	**(0.22)**	**0.37**	**(0.16)**	**1.05**	**(0.45)**	**0.05**	**0.14**
AS T1 C-D1	0-18	0-18	1.37	[redacted]	11.73		0.97		0.86	0.07
AS T1 C-D1	18-40	18-40	0.64		0.26		6.10		0.04	0.95
AS T1 C-D1	40-60	40-60	1.36		0.35		1.33		0.03	0.10
AS T1 C-D2	60-80	10-30	0.79	[redacted]	0.17	[redacted]	1.22	[redacted]	0.02	0.15
AS T1 C-D2	80-98	30-48	0.91	[redacted]	0.23		0.85		0.02	0.09
AS T1 C-D2	98-116	48-66	1.22	[redacted]	0.21		0.50		0.02	0.04
AS T1 C-D3	116-135	1-20	1.12	[redacted]	0.17		0.55		0.02	0.05
AS T1 C-D3	135-155	20-40	0.60		0.16		0.56		0.03	0.09
AS T1 C-D3	155-175	40-60	0.75		0.15		0.59		0.02	0.08
AS T1 C-D3	175-196	60-81	1.04		0.30		2.34	[redacted]	0.03	0.22
AS T1 C	**MEAN ±**	**(std. dev.)**	**0.97**	**(0.28)**	**1.28**	**(3.39)**	**1.58**	**(1.80)**	**0.13**	**0.16**
AS T2 A-D1	2-12	2-12	0.52		NS		NS			
AS T2 A-D1	12-23	12-23	0.67		NS		NS			
AS T2 A-D2	23-40	3-20	0.84		NS		NS			
AS T2 A-D2	40-70	20-50	0.73	[redacted]	NS		NS			
AS T2 A-D2	70-88	50-68	0.60		NS		NS			
AS T2 A-D3	88-113	3-28	1.08		NS		NS			
AS T2 A-D3	113-134	28-49	0.90		NS		NS			
AS T2 A-D3	134-165	49-80	1.00	[redacted]	NS		NS			
AS T2 A-D4	165-194	25-54	1.02		NS		NS			
AS T2 A-D4	194-212	54-72	2.83		NS		NS			
AS T2 A	**MEAN ±**	**(std. dev.)**	**1.03**	**(0.67)**						
AS T2 B-D1	0-16	0-16	0.67		NS		NS			
AS T2 B-D1	16-37	16-37	0.91		NS		NS			

Site ID and Core[1]	Field: Depth interval[2] (cm)	Core: Depth Interval[3] (cm)	THg (µg/g)		$Hg(II)_R$ (ng/g)		MeHg (ng/g)		$Hg(II)_R$ (%)	MeHg (%)
AS T2 B-D1	37-54	37-54	1.17		NS		NS			
AS T2 B-D1	54-93	54-73	0.91	[redacted]	NS		NS			
AS T2 B-D2	97-124	12-39	0.87		NS		NS			
AS T2 B-D2	124-144	39-59	0.53		NS		NS			
AS T2 B-D2	144-175	59-90	0.99		NS		NS			
AS T2 B-D3	175-201	25-51	1.81	[redacted]	NS		NS			
AS T2 B-D3	201-231	51-81	2.47		NS		NS			
AS T2 B	**MEAN ±**	**(std. dev.)**	**1.19**	**(0.64)**						
AS T2 C-D1	0-12	0-12	0.60		NS		NS			
AS T2 C-D1	12-24	12-24	0.65		NS		NS			
AS T2 C-D1"	24-37	4-17	0.62		NS		NS			
AS T2 C-D1"	37-50	17-30	0.51		NS		NS			
AS T2 C-D2	50-75	0-25	0.75		NS		NS			
AS T2 C-D2	75-103	25-53	0.73	[redacted]	NS		NS			
AS T2 C-D2	103-129	53-79	0.77		NS		NS			
AS T2 C-D3	129-147	4-22	0.61		NS		NS			
AS T2 C-D3	147-183	22-58	0.79		NS		NS			
AS T2 C-D3	183-204	58-79	1.42	[redacted]	NS		NS			
AS T2 C	**MEAN ±**	**(std. dev.)**	**0.78**	**(0.26)**						
AS T3 A-D1	0-15	0-15	0.57		6.90		2.14		1.22	0.38
AS T3 A-D1	15-46	15-46	0.68		0.36		3.04		0.05	0.45
AS T3 A-D2	46-72	1-27	0.72	[redacted]	0.34		0.72		0.05	0.10
AS T3 A-D2	72-98	27-53	0.83		0.35		< 0.33		0.04	< 0.04
AS T3 A-D2	98-124	53-79	0.99		0.27		0.43		0.03	0.04
AS T3 A-D3	127-157	2-32	0.78		0.35		0.52		0.05	0.07
AS T3 A-D3	157-189	32-64	1.85		0.52		1.17		0.03	0.06
AS T3 A-D3	189-209	64-83	1.34		0.57		1.87		0.04	0.14
AS T3 A	**MEAN ±**	**(std. dev.)**	**0.99**	**(0.44)**	**0.87**	**(1.65)**	**1.24**	**(0.95)**	**0.09**	**0.12**

Site ID and Core[1]	Field: Depth interval[2] (cm)	Core: Depth Interval[3] (cm)	THg (µg/g)		Hg(II)$_R$ (ng/g)		MeHg (ng/g)		Hg(II)$_R$ (%)	MeHg (%)
AS T3 B-D1	0-8	0-8	0.31		0.09		0.47		0.03	0.15
AS T3 B-D1	8-40	8-40	1.16	[redacted]	0.24	[redacted]	1.66	[redacted]	0.02	0.14
AS T3 B-D1	40-70	40-70	1.75	[redacted]	0.30		0.85		0.02	0.05
AS T3 B-D2	70-108	10-48	0.75		0.21		0.64	[redacted]	0.03	0.08
AS T3 B-D2	108-133	48-73	1.07		0.24		0.42		0.02	0.04
AS T3 B-D2	133-143	73-83	0.54		0.27		0.27		0.05	0.05
AS T3 B-D3	143-172	13-42	0.89		0.30		< 0.21		0.03	< 0.02
AS T3 B-D3	172-212	42-82	0.85	[redacted]	0.52	[redacted]	< 0.28	[redacted]	0.06	< 0.03
AS T3 B	**MEAN ±**	**(std. dev.)**	**1.00**	**(0.47)**	**0.29**	**(0.12)**	**0.65**	**(0.52)**	**0.03**	**0.06**
AS T3 C-D1	0-12	0-12	0.55		8.17		1.07	[redacted]	1.50	0.20
AS T3 C-D1	12-45	12-45	0.67		0.32		1.55		0.05	0.23
AS T3 C-D2	45-64	0-19	0.62		0.18		0.87		0.03	0.14
AS T3 C-D2	64-91	19-46	0.86		0.18		0.45		0.02	0.05
AS T3 C-D2	91-127	46-82	0.97	[redacted]	0.14		0.43		0.01	0.04
AS T3 C-D3	127-181	2-56	1.31		0.33		0.53		0.02	0.04
AS T3 C-D3	181-199	56-74	0.94		0.02		< 0.30		0.00	< 0.03
AS T3 C	**MEAN ±**	**(std. dev.)**	**0.94**	**(0.29)**	**0.70**	**(1.59)**	**0.71**	**(0.43)**	**0.08**	**0.08**
AS T4 A-D1	0-19.5	0-19.5	0.54		NS		NS			
AS T4 A-D1	19.5-31	19.5-31	0.72		NS		NS			
AS T4 A-D2	31-50	1-20	0.62		NS		NS			
AS T4 A-D2	50-70	20-40	0.57		NS		NS			
AS T4 A-D2	70-100	40-70	0.83		NS		NS			
AS T4 A-D3	100-115	10-25	1.49		NS		NS			
AS T4 A-D3	115-150	25-60	0.59		NS		NS			
AS T4 A-D3	150-174	60-84	1.75		NS		NS			
AS T4 A-D4	174-200	44-70	1.45		NS		NS			
AS T4 A	**MEAN ±**	**(std. dev.)**	**0.95**	**(0.47)**						

Site ID and Core[1]	Field: Depth interval[2] (cm)	Core: Depth Interval[3] (cm)	THg (µg/g)		Hg(II)_R (ng/g)	MeHg (ng/g)		Hg(II)_R (%)	MeHg (%)
AS T4 B-D1	0-7.5	0-7.5	0.49		NS	NS			
AS T4 B-D1	7.5-20	7.5-20	0.20		NS	NS			
AS T4 B-D1	20-56	20-56	0.84	[redacted]	NS	NS			
AS T4 B-D1	56-93	56-93	1.52		NS	NS			
AS T4 B-D2	93-106	13-26	1.81		NS	NS			
AS T4 B-D2	106-109	26-29	1.51		NS	NS			
AS T4 B-D2	109-123	29-42.5	2.37		NS	NS			
AS T4 B-D2	123-133	42.5-52.5	1.12		NS	NS			
AS T4 B-D2	133-144	52.5-63.5	1.40		NS	NS			
AS T4 B-D2	144-156	63.5-76	0.08		NS	NS			
AS T4 B-D3	156-183	16-43	0.69		NS	NS			
AS T4 B-D3	183-196	43-56	0.91		NS	NS			
AS T4 B	**MEAN ±**	**(std. dev.)**	**1.08**	**(0.68)**					
AS T4 C-D1	0-17	0-17	0.48		NS	NS			
AS T4 C-D1	17-40	17-40	0.65	[redacted]	NS	NS			
AS T4 C-D1	40-64	40-64	1.26		NS	NS			
AS T4 C-D2	64-100	14-50	0.80		NS	NS			
AS T4 C-D2	100-131	50-81	1.97		NS	NS			
AS T4 C-D3	131-151	1-21	0.91		NS	NS			
AS T4 C-D3	151-174	21-44	1.01		NS	NS			
AS T4 C-D3	174-199	44-68.5	0.83		NS	NS			
AS T4 C	**MEAN ±**	**(std. dev.)**	**1.03**	**(0.48)**					
AS T5 A-D1	0-12.5	0-12.5	0.54		4.17	0.79		0.78	0.15
AS T5 A-D1	12.5-27.3	12.5-27.3	0.73		0.41	1.14		0.06	0.16
AS T5 A-D2	20-30	0-10	0.50		10.02	< 0.30		2.01	< 0.06
AS T5 A-D2	30-40	10-20	0.49	[redacted]	0.25	1.38		0.05	0.28
AS T5 A-D2	40-70	20-50	0.59		0.33	< 0.33		0.06	< 0.06
AS T5 A-D2	70-101	50-81	0.67	[redacted]	0.24	0.46	[redacted]	0.04	0.07

Site ID and Core[1]	Field: Depth interval[2] (cm)	Core: Depth Interval[3] (cm)	THg (µg/g)		Hg(II)_R (ng/g)		MeHg (ng/g)		Hg(II)_R (%)	MeHg (%)
AS T5 A-D3	85-101	0-20	0.94		0.21		0.66	[redacted]	0.02	0.07
AS T5 A-D3	105-125	20-40	0.53		0.22		< 0.32		0.04	< 0.06
AS T5 A-D3	125-157	40-71	0.52		0.20		0.59		0.04	0.11
AS T5 A-D4	145-185	0-40	0.51	[redacted]	0.16	[redacted]	0.63	[redacted]	0.03	0.12
AS T5 A-D4	185-200	40-55	1.43		0.21		0.76		0.01	0.05
AS T5 A-D4	200-228	55-82	1.41		0.17		< 0.32		0.01	< 0.02
AS T5 A	**MEAN ±**	**(std. dev.)**	**0.73**	**(0.34)**	**0.80**	**(1.70)**	**0.58**	**(0.31)**	**0.11**	**0.08**
AS T5 B-D1	0-20	0-20	0.36		0.18		0.97	[redacted]	0.05	0.27
AS T5 B-D1	20-50	20-50	0.59		0.12		0.51		0.02	0.09
AS T5 B-D1	50-79	50-79	1.01		0.32		< 0.31		0.03	< 0.03
AS T5 B-D2	79-94	9-24	1.16		0.23		0.87		0.02	0.08
AS T5 B-D2	94-130	24-60	0.82	[redacted]	0.21		0.70		0.03	0.09
AS T5 B-D2	130-166	60-96	0.88		0.34		0.72		0.04	0.08
AS T5 B-D3	167-202	17-52	0.90	[redacted]	0.34	[redacted]	0.83	[redacted]	0.04	0.09
AS T5 B-D3	202-212	52-62	0.54		0.21		0.38		0.04	0.07
AS T5 B	**MEAN ±**	**(std. dev.)**	**0.80**	**(0.27)**	**0.25**	**(0.08)**	**0.67**	**(0.24)**	**0.03**	**0.08**
AS T5 C-D1	0-15	0-15	0.41		0.45		5.82		0.11	1.41
AS T5 C-D1	15-30	15-30	0.50		0.13		1.18	[redacted]	0.03	0.24
AS T5 C-D1	30-49	30-49	0.64		0.06		< 0.37		0.01	< 0.06
AS T5 C-D2	50-81	0-31	0.68		0.37		0.67		0.05	0.10
AS T5 C-D2	81-112	31-62	0.78		0.12		< 0.35		0.02	< 0.05
AS T5 C-D2"	112-130	40-58	0.68		0.11		< 0.35		0.02	< 0.05
AS T5 C-D3	130-150	10-30	1.75		0.44		0.56		0.03	0.03
AS T5 C-D3	150-175	30-55	0.66		0.16		0.53		0.03	0.08
AS T5 C-D3	175-198	55-78	0.99		0.49		0.78		0.05	0.08
AS T5 C	**MEAN ±**	**(std. dev.)**	**0.80**	**(0.40)**	**0.26**	**(0.17)**	**0.98**	**(1.46)**	**0.03**	**0.12**
ALL DATA		**MEAN**	**0.93**		**0.35**		**0.56**		**0.04**	**0.06**

Site ID and Core[1]	Field: Depth interval[2] (cm)	Core: Depth Interval[3] (cm)	THg (µg/g)	$Hg(II)_R$ (ng/g)	MeHg (ng/g)	$Hg(II)_R$ (%)	MeHg (%)
ALL DATA		STD. DEV.	0.45	0.91	0.56	0.32	0.19
ALL DATA		STD. ERR.	0.04	0.10	0.06	0.04	0.02
ALL DATA		MEDIAN	0.80	0.25	0.69	0.03	0.08
ALL DATA		MINIMUM	0.08	0.02	< 0.21	0.00	< 0.02
ALL DATA		MAXIMUM	2.83	11.73	6.10	2.01	1.41
ALL DATA		TOTAL N	140	82	82	82	82

[1] Core coding: AS T# [A, B or C]-D#; where AS = Alviso Slough; T# = Transect number (1 thru 5); [A, B or C] = Site description as per Table 1 (left marsh, right marsh or slough channel, respectively); D# = depth specific core segment

[2] Field depth interval measured from the sediment / water interface

[3] Core depth interval measured from the top of the individual core liner

Appendix IV

Hydraulic Modeling and Analysis of Project Alternatives

Santa Clara Valley
Water District

MEMORANDUM

FC 14 (01-02-07)

TO: Alviso Slough Restoration Project Team

FROM: Christy Chung and Liang Xu

SUBJECT: UNET Analyses of Alternatives 1–5

DATE: September 20, 2007
Revised February 20, 2009

Summary

The analyses described in this technical memo were initiated to:

- Determine the flood conveyance capacity and one-percent flood protection impacts of the proposed alternatives for the Alviso Slough Restoration Project on Alviso Slough between Gold Street and the County Marina, and the Alviso Baylands.
- Find solutions for potential impacts.

Background

Based on reports by District staff and comments from Alviso residents, the District Board of Directors approved the following motion on January 20, 2004:

> *That the Board direct staff to prepare a project that includes the following: Phase I, removal of 7 acres of vegetation and root mass to a depth of 4 feet on both banks of the Alviso Slough from the Gold Street bridge to the County Marina; and then in the following year a long term project related to bringing in salt water.*

Philip Williams and Associates (PWA) has assisted the District with the development of project alternatives and the necessary hydraulic analyses to evaluate potential impacts to the existing one-percent flood protection elements in this area. The project alternatives are summarized in Table 1.

Table 1. Summary of Alternatives

Project Alternative	Area Impacted	Work Proposed
Alternative 1	2.6 acres	Vegetation and Root Mass Removal
Alternative 2	7.0 acres	Vegetation and Root Mass Removal
Alternative 3	3.7 acres	Dredging (to 8-foot depth)
Alternative 4	6.2 acres	Dredging (to 16-foot depth)
Alternative 5	25 acres	Vegetation and Root Mass Removal, Dredging (to 10-foot depth)

The project objectives are to:

- Restore Alviso Slough's channel width and habitat to prior to 1983 conditions.
- Improve the community's ability to pursue navigation, access, and aesthetics to encourage the expansion of boating and other recreational and/or tourism opportunities.
- Maintain one-percent flood protection in Alviso Slough.
- Reduce mosquito nuisance.
- Promote the integration with the South Bay Salt Pond Restoration Project (including the Pond A8 Applied Study) to bring salt water connections to the Lower Guadalupe River.

The future implementation of the SBSP Restoration Project Phase 1 was considered during this analysis. One of the planned Phase 1 actions is to construct an armored notch adjacent to the Pond A8N engineered overflow weir. This notch would transform Pond A8N to a muted tidal environment. During the implementation of Phase 1 activities at Pond A8, the SBSP Restoration Program would be monitoring the pond and Alviso Slough for scour, mercury methylization, and fish stranding. Currently, the notch is planned to be closed in the winter due to these concerns.

A photo of the project area taken in 2005 is shown in Figure 1.

2002 Design - Lower Guadalupe River Flood Protection Project (LGRP)

During the design process for the LGRP, Alviso Slough was modeled using both steady and unsteady flow models. Unsteady flow analyses were conducted for the District by Northwest Hydraulic Consultants (NHC). In June 2002 the findings from these analyses were published in a technical memorandum and included in the LGRP Engineer's Report (SCVWD 2002). This study was based on 1996 survey data. The model was created using UNET, a one-dimensional unsteady flow model created by the U. S. Army Corps of Engineers Hydrologic Engineering Center (HEC). For Alviso Slough, the model extended from San Francisco Bay to State Route 237. The following flow condition was modeled: a 10-year tide (high tide elevation of 10.2 feet NAVD88) and a 100-year storm event, with pumped interior drainage flows from the cities of San Jose and Santa Clara, resulting in a peak flowrate of 18,350 cfs in the Lower Guadalupe River at Alviso.

Pond A8N Overflow Weir

Lower Guadalupe River becomes Alviso Slough at the UPRR Bridge. During high flow events, a portion of the flow in Alviso Slough can be conveyed to Pond A8N via a 1,000-foot-long multi-crested engineered weir constructed by the District in 2004 as part of the LGRP. The flood management plan for the LGRP included construction of this weir to allow overflow and temporary storage of Alviso Slough flows that exceed a certain threshold, so as to protect the Town of Alviso from fluvial (river) flooding up to the 1 percent, or 100-year event.

If flows in Alviso Slough downstream of the UPRR Bridge exceed 5,400 cfs (approximately the 8-year return period event), a portion of these flows will overtop the weir and enter Pond A8N. Table 2 provides the 2002 modeled Alviso Slough flows and flows overtopping the Pond A8 weir at the peak of various return period events: the 8-, 10-, 25-, 50- and 100-year flow events. Table 2 also presents the total estimated volume of the spills into Pond A8 over the course of the overflow period, which would last from 15 to 38 hours, depending on the level of the storm event. It should be noted that these modeled flows were based on 1996 survey information for Alviso Slough channel geometry.

Table 2. Alviso Slough Flow Events that Trigger Overflows to Pond A8 via Weir (2002 Model based on 1996 Survey of Alviso Slough Channel Geometry)

Return Period Event	Peak Flow at UPRR Bridge (cfs)	Peak Overflow to Pond A8 (cfs)	Peak Flow in Alviso Slough Downstream of Weir (cfs)	Total Period of Time that Weir Overflow Occurs (hrs)	Total Volume that enters Pond A8 (acre-feet)
8-year	5,400	0	5,400	0	0
10-year	6,700	480	6,200	16	700
25-year	10,000	2,700	7,300	23	4,400
50-year	13,500	4,800	8,700	29	8,900
100-year	18,200	8,500	9,800	38	14,300

As presented in Table 2, under the 1996 channel conditions used in the 2002 LGRP design, for a 100-year event peak flow of 18,350 cfs in Alviso Slough downstream of the UPRR Bridge, hydraulic modeling indicates that, at the peak, about 8,500 cfs would overtop the Pond A8 weir, and about 9,800 cfs (54%) would be conveyed down the slough.

Figure 2 shows the Pond A8 Weir overflow area and the LGRP-engineered flow split. Figure 3 presents a hydrograph (flow over time) for the 100-year event that graphically depicts what flows down Alviso Slough and what overtops the weir and enters Pond A8 during such a storm event.

Since the completion of the LGRP in 2004, the winter storms and subsequent runoff that have occurred on the Guadalupe River have not triggered a single incident of weir overflows.

Pond A5 through A8 Storage System

The pond system that includes Ponds A5, A6, A7, A8S, and A8N (Figure 4), acts as a large storage basin, bounded by Alviso Slough levees to the east, Pond A6 levees to the north, and Guadalupe Slough levees to the west. There are also internal levees that separate the ponds from each other. The flow from pond to pond is controlled by the internal levee elevations. During high flow events, a portion of the flow in Alviso Slough overtops the Pond A8N weir and enters Pond A8N. When flow from Pond A8N reaches an elevation of 3 to 4 feet (NAVD88), flows spill over the internal levees into Ponds A5, A8S, and A7. When water levels in Pond A7 reach an elevation of approximately 5 feet (NAVD88), water will spill into Pond A5. When Ponds A7 and A5 fill to approximately 10 feet NAVD88, water will spill into Pond A6 and also spill from Pond A5 into Guadalupe Slough and out to the Bay. This is illustrated in Figure 4.

In their 2002 report, NHC calculated the available storage volume in the ponds. This volume was based on a "brimful" water elevation in the ponds of 10.26 feet (NAVD88). The available storage volumes are shown in Table 3.

Table 3. Available Pond Storage

Pond Number	Surface Area	Pre-Storm Elevation	Maximum Stage	Maximum Pond Volume Available for Storing Overflows
	(acres)	(ft NAVD88)	(ft NAVD88)	(acre-ft)
A8W	414.77	0.53	10.26	4,000
A5	626.78	2.85	10.26	4,600
A8D	181.24	2.90	10.26	1,400
A7	259.81	2.81	10.26	1,900
~~A6~~	~~342.62~~	~~3.00~~	~~10.26~~	~~2,500~~
Total				**11,900**

Currently, there are plans to return Pond A6 to tidal conditions.

There are currently plans to breach the bayside levees on Pond A6, restoring it to full tidal conditions. Thus, it will no longer be available to provide temporary storage of Alviso Slough overflows to Pond A8.

Based on the modeled flow conditions for various storm return period events as presented in Table 2, the total volume of overflow would be contained by Ponds A5–A8 for the 10-, 25-, and 50-year events. Overflow volumes from an event close to the 100-year event would exceed the available storage capacity of the pond system.

Guadalupe Slough

Guadalupe Slough borders the pond system on the west, as shown in Figure 4. It conveys flows from Sunnyvale East Channel, Sunnyvale West Channel, Calabazas Creek, and San Tomas Aquino Creek to San Francisco Bay. A one-percent flood event was also simulated for Guadalupe Slough. As stated in the previous paragraph, the modeled overflow volume for an event close to the 1 percent or 100-year event would exceed the available storage of Ponds A5–A8. There are low spots on the Guadalupe Slough east levee bordering Pond A5. In a one-percent event, it is likely that up to 2,500 acre-feet of water may overtop the levee along Pond A5 and enter Guadalupe Slough. The timing of this overflow is such that it would occur after the peak flow in Guadalupe Slough has passed; thus, there are no adverse impacts of flooding anticipated along Guadalupe Slough.

LGRP Ongoing Capacity Assessment

To assess the required operations and maintenance work for the LGRP, the O&M Plan for the LGRP includes conducting cross-section surveys of the Alviso Slough channel geometry every five years. The first such survey was performed in 2004, and the next scheduled survey is in 2009. In addition, annual marsh studies are conducted by the City of San Jose and provide data on vegetation growth in Alviso Slough.

2005 Updated Hydraulic Modeling Based on 2004 Channel Surveys

As per the LGRP O&M Plan, cross-section surveys of Alviso Slough between Union Pacific Railroad (UPRR and San Francisco Bay were conducted in 2004 by the Santa Clara Valley Water District's Land Surveying and Mapping Unit. The hydraulic models for Alviso Slough flood management were updated in 2005 based on the new channel cross-section information, and are referred to herein as the 2005 Condition.

The NHC 2002 Design UNET model was modified to reflect the 2004 survey data. The hydraulic modeling using the updated survey information indicated that the slough has experienced a reduction in conveyance capacity since the 2002 LGRP design, due primarily to encroachment of vegetation in the slough. Table 4 presents the modeled flow events that would trigger overflows to Pond A8 via the weir under the updated 2005 Condition.

Table 4. Alviso Slough Flow Events that Trigger Overflows to Pond A8 via Weir (2005 Model based on 2004 Survey of Alviso Slough Channel Geometry)

Return Period Event	Peak Flow at UPRR Bridge (cfs)	Peak Overflow to Pond A8 (cfs)	Peak Flow in Alviso Slough Downstream of Weir (cfs)	Total Period of Time that Weir Overflow Occurs (hrs)	Total Volume that enters Pond A8 (acre-feet)
8-year	5,400	0	5,400	0	0
10-year	6,700	800	5,900	16	900
25-year	10,000	3,200	6,800	23	4,800
50-year	13,500	5,700	7,800	29	9,600
100-year	18,200	10,000	8,300	38	17,100

In comparing the modeling results in Table 4 with those for the 1996 survey channel conditions in Table 2, the overflows to the weir are triggered for the same return-period events. The changed slough conditions would not trigger a more frequent occurrence of weir overflows. However, as shown in Table 4, the level of flows over the weir is increasing, and the total volume of the overflows for each of the listed events would increase as well.

For the 1 percent or 100-year event, the changed conditions in the slough would nearly reverse the modeled flow split. As shown in Table 2, based on 1996 conditions, the flow over the weir at peak was 8,500 cfs, and the flow remaining in Alviso Slough at peak was 9,800 cfs. As seen in Table 4, the reduced conveyance capacity of Alviso Slough, as documented by the 2004 surveys, would result in 10,000 cfs at the peak of weir overflow, and only 8,300 cfs at peak flow in Alviso Slough.

Comparing the total volume of the overflows to the Pond A5-A8 system in Table 4 with the available storage in Table 3, the overflow volume for the 50-year event would still be contained by the available storage, but if a 1 percent or 100-year event occurred, an excess of approximately 5,500 acre-feet would eventually spill over the Pond A5 levees into Guadalupe Slough.

2007 Hydraulic Modeling for Alviso Slough Restoration Project

Modeling Approach

To assess the potential effects of the proposed alternatives for the Alviso Slough Restoration Project, the 2005 Condition model was used and modified as appropriate to reflect the changed slough conditions between Gold Street and the Alviso County Marina for each alternative.

The footprints of the five alternatives were plotted with the cross-section cut lines from the 2004 survey of Alviso Slough completed by the District's Land Surveying and Mapping Unit. A plan view of the five alternatives is shown in Figures 5 to 9. Based on the cross-section change schematic provided by PWA, shown in Figure 10, the cross-section geometry for each cross-section was changed accordingly.

Channel roughness was also adjusted in the UNET model. NHC had used a Manning's n-value of 0.03 to represent the open water channel, and 0.2 to represent the vegetated overbanks. These values were maintained in the UNET model, but the extent of the open water channel was adjusted to reflect the change in channel geometry for each of the alternatives. An n-value of 0.045 was used for the areas with vegetation/root mass removal but no dredging.

Findings

The UNET model results indicate that all the project alternatives would create changes in the Alviso Slough water surface elevation profile between Gold Street and the Alviso County Marina. Table 5 shows the modeled peak flow split between Pond A8N and Alviso Slough for the five project alternatives during a 1-percent event.

Table 5. Impact of Project Alternatives on Modeled Flow Split Between Pond A8N Weir Overflows and Alviso Slough Conveyance for the 1-Percent (100-Year) Event

Condition	Peak Flow to Pond A8W	Peak Flow in Alviso Slough	Total Peak Flow in One-Percent Event	Is Alviso Slough Conveyance Capacity Exceeded?	If Yes, By How Much?
	(cfs)	(cfs)	(cfs)		
2005	10,000	8,300	18,300	No	
Alternative 1	9,800	8,500	18,300	Yes	200
Alternative 2	9,400	8,900	18,300	Yes	600
Alternative 3	9,600	8,700	18,300	Yes	400
Alternative 4	8,900	9,400	18,300	Yes	1,100
Alternative 5	9,000	9,300	18,300	Yes	1,000

With increasing areas of removal of vegetation and root mass for Alternatives 1 and 2, and the dredging of the channel in Alternatives 3 and 4, the hydraulic capacity of Alviso Slough between Gold Street and the Alviso County Marina is progressively increased. The results in Table 5 indicate that the flowrate overtopping the weir at peak flow would decrease, while the flowrate conveyed via Alviso Slough during peak flow would increase.

For Alternative 5, approximately 10 acres of the slough would be dredged and an additional 15 acres would be cleared of vegetation and root mass. Because of less dredging downstream of the weir, the water surface elevation there is higher than that of the Alternative 4. Even with more vegetation removal near the weir, the water surface profile is still higher than that of Alternative 4 due to the backwater effect. Therefore, the peak overflow rate at the weir increases slightly for Alternative 5.

Levees

As established by the 2004 surveyed slough conditions, the channel downstream of the Alviso County Marina can only convey approximately 8,300 cfs without overtopping the levees along Ponds A11 and A12. As shown in Table 5, all proposed project alternatives would convey more flow than the slough channel's capacity in a 1-percent event, which could overtop these levees. To mitigate for this impact, the engineered weir at Pond A8N would have to be lowered to divert more flow to the pond system, and thus reduce the water surface elevations for the remaining flows that are conveyed downstream along Alviso Slough. For each proposed project alternative, Table 6 presents the necessary extent of the Pond A8N weir modification. Table 6 also presents the resultant modeled flow splits, which are similar to the 2005 modeled condition as presented in Table 4.

Table 6. Modeled Flow Split Between Pond A8N Weir Overflows and Alviso Slough Conveyance—Project Alternatives

Project Alternative	Slough Area Impacted (acres)	Extent of Lowering Pond A8 Weir (all elevations NAVD88)	Length of Weir Modification (ft)	Resulting Modeled Flows to Pond A8N* (cfs)	Resulting Modeled Flows in Alviso Slough d/s of A8N Weir* (cfs)
1	2.6	1.3 ft (to el. 11.4 ft)	200	10,100	8,200
2	7.0	1.4 ft (to el. 11.4 ft)	350	10,000	8,300
3	3.7	1.3 ft (to el. 11.4 ft)	200	10,000	8,300
4	6.2	0.7 ft (to el. 10.7 ft) 1.4 ft (to el. 11.4 ft)	630 370	10,100	8,200
5	25	0.5 ft (to el. 10.9 ft) 1.4 ft (to el. 11.4 ft)	630 370	10,000	8,300

**Note: Modeled flows represent flow split at peak flow (18,350) of a one-percent event.*

South Bay Salt Pond Restoration Project Phase 1 Actions

The hydraulic analyses performed for the evaluation of the Alviso Slough Restoration Project alternatives assumed, conservatively, that the proposed SBSP Phase 1 action—an armored notch at Pond A8N that would restore a muted tidal action to Alviso Slough—is not in place. If the notch is constructed and opened to its maximum width (40 feet) on a year-round basis, it would provide an additional means for high flood flows to enter the pond system and the stated weir modifications in Table 6 would be reduced. Since the full use of the proposed notch is not assured at this time, it is recommended that the weir modifications presented in Table 6 be incorporated into the project work for the project alternative that will be approved for implementation.

Frequency of Overflows to Pond A8N

Under the 2002 design condition (Table 2), flows would overtop the Pond A8N weir when flow in Alviso Slough would exceed 5,400 cfs. As shown in Table 5, under the 2005 condition, flows would also begin to overtop the Pond A8N weir when Alviso Slough flows would exceed 5,400 cfs. The proposed weir modifications presented in Table 6 for the five proposed project alternatives would maintain the 2005 condition of weir and flow splits. Thus, implementing the proposed project would not increase the frequency of weir overflow events.

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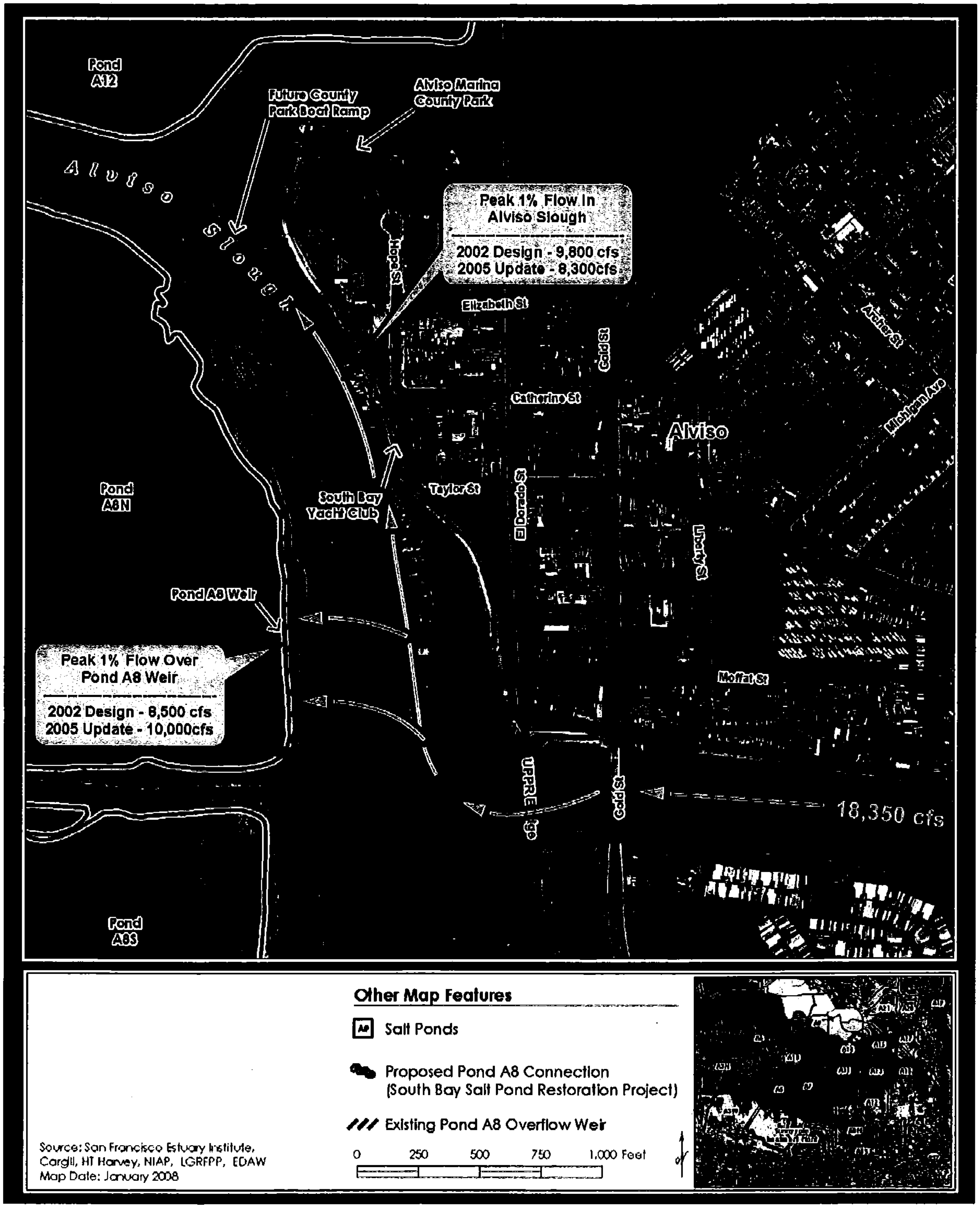
2005/02/03

Figure 1. Photo of Alviso Slough Restoration Project Area Looking Upstream from Vicinity of Alviso County Marina



Source: San Francisco Estuary Institute, Cargill, HT Harvey, NIAP, LGRFPP, EDAW
Map Date: January 2008

Figure 2. Portion of Lower Guadalupe River System

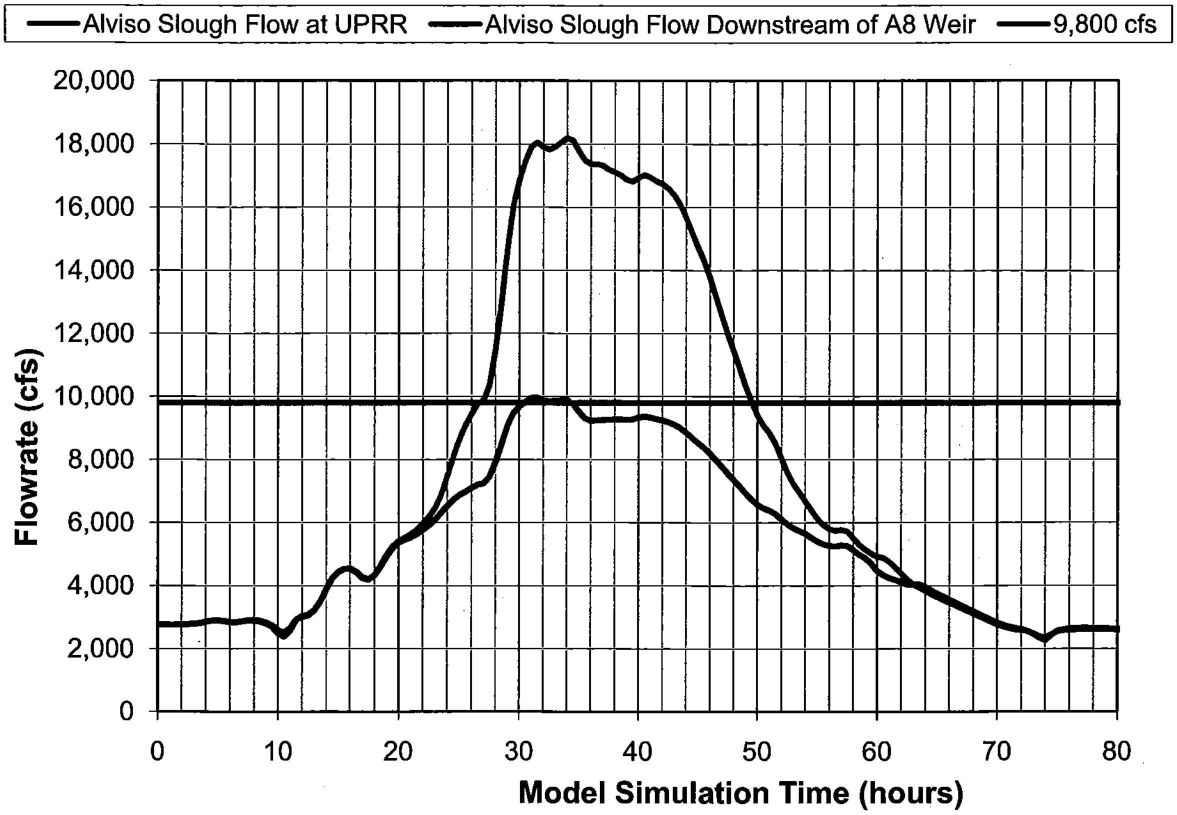


Figure 3. Flow Split

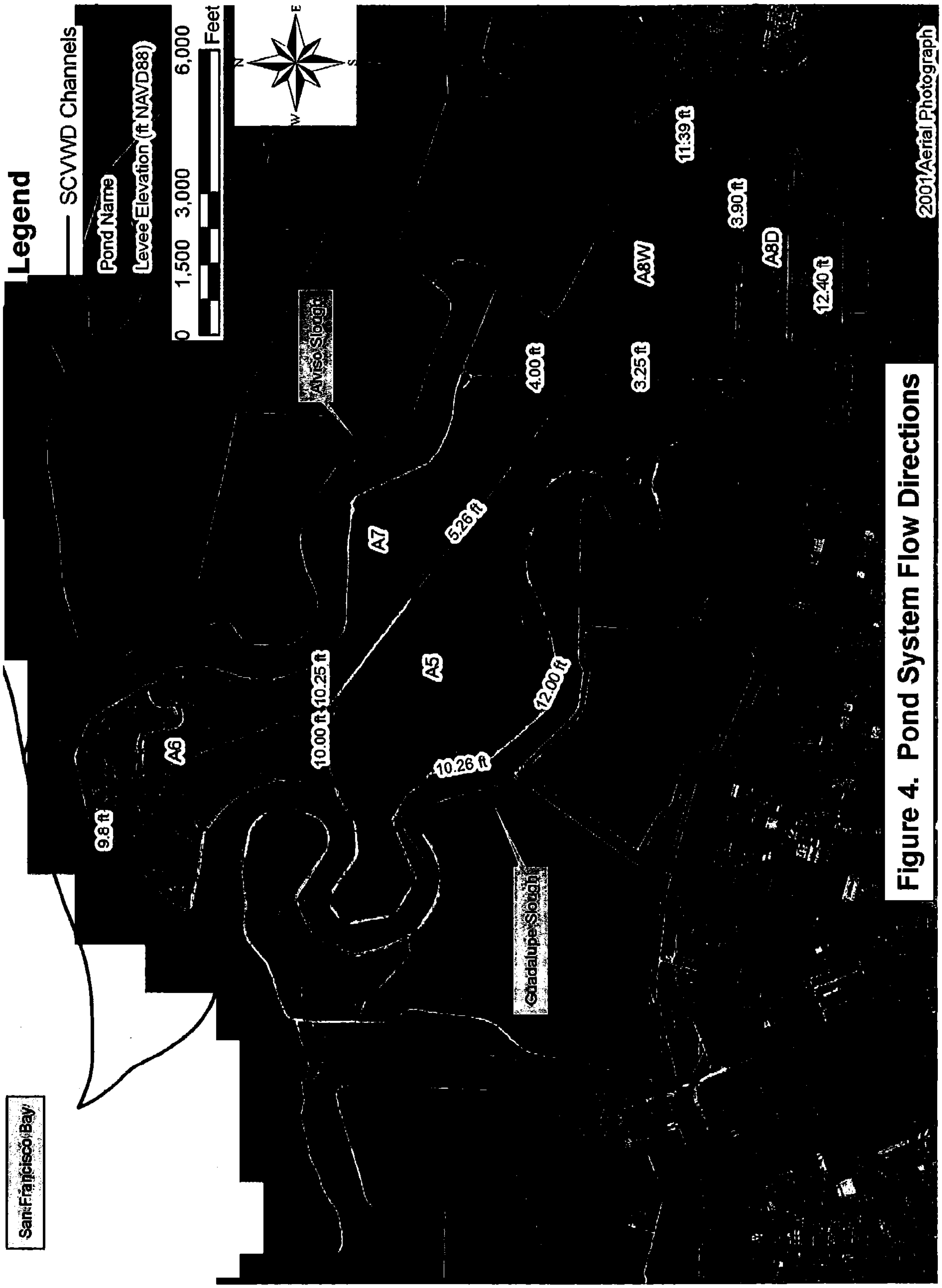
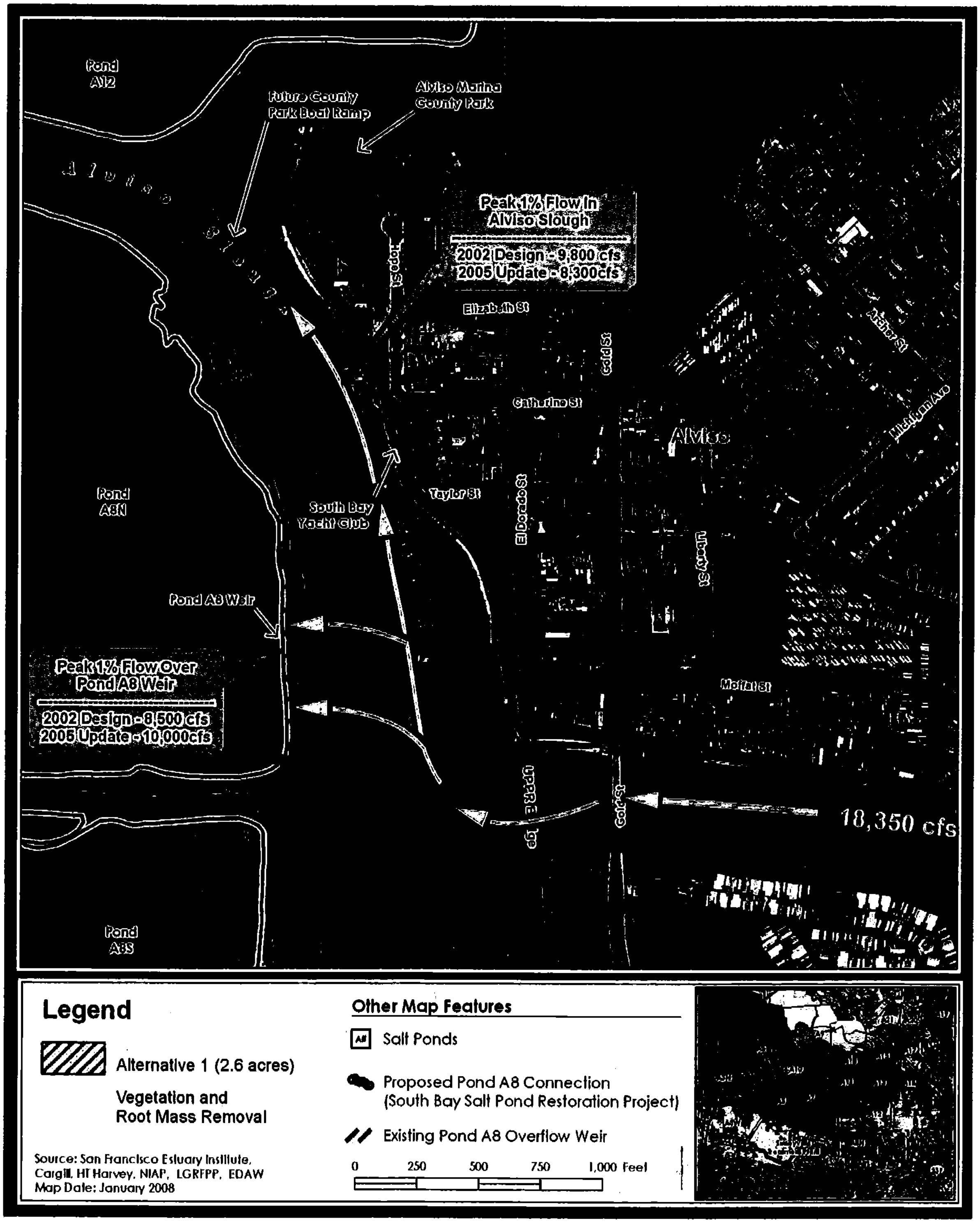
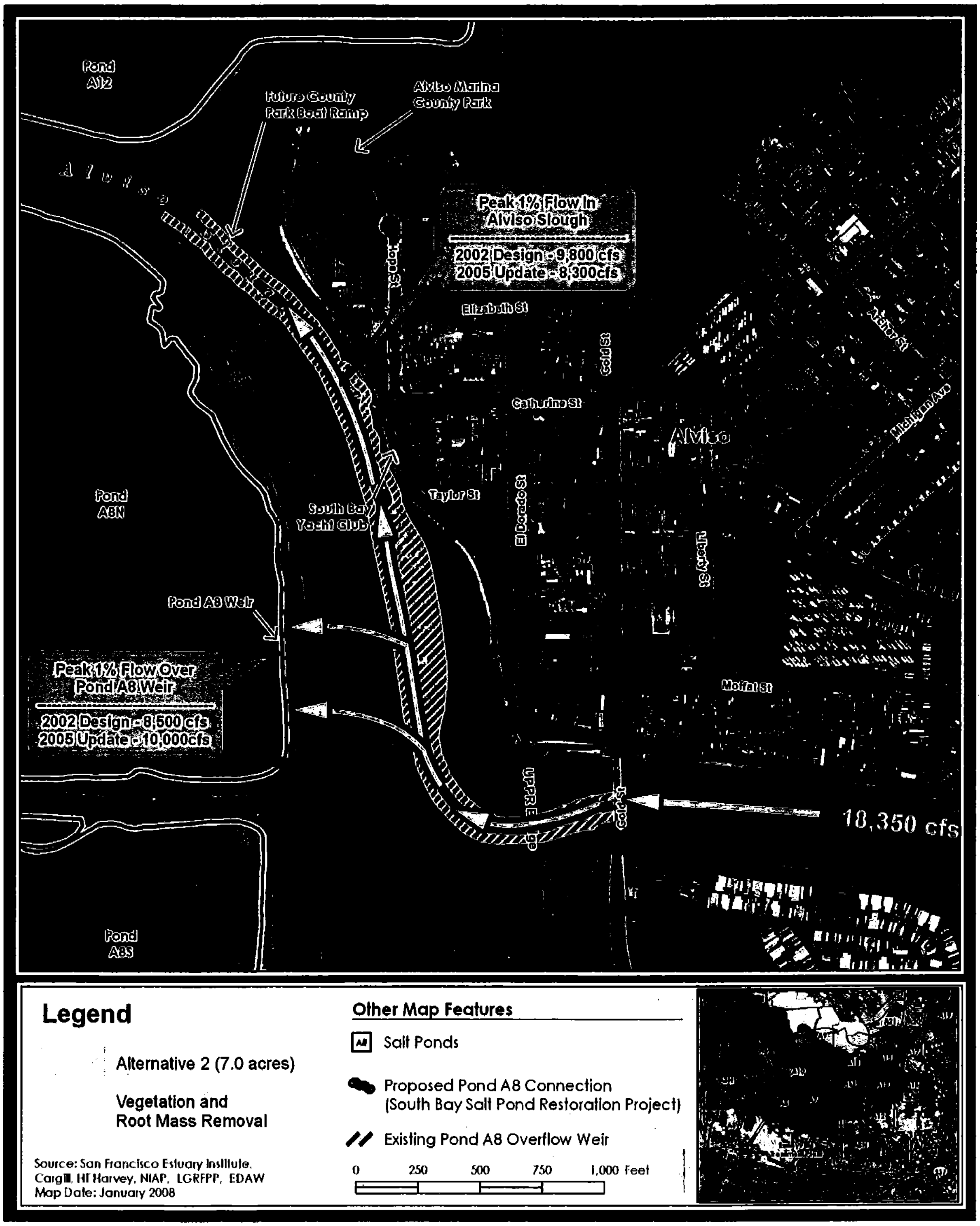


Figure 4. Pond System Flow Directions



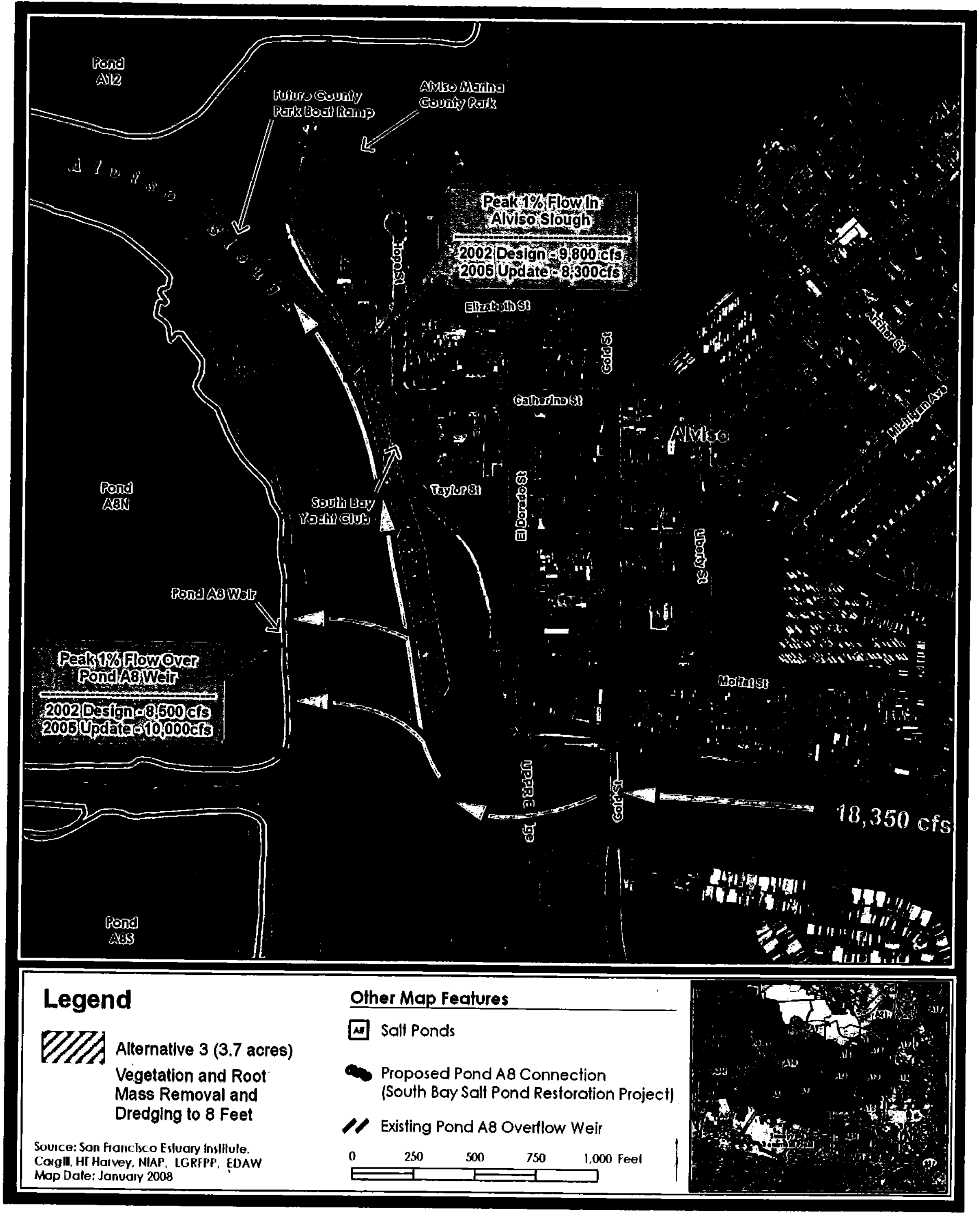
Source: San Francisco Estuary Institute, Cargill, HT Harvey, NIAP, LGRFPP, EDAW
Map Date: January 2008

Figure 5. Alternative 1



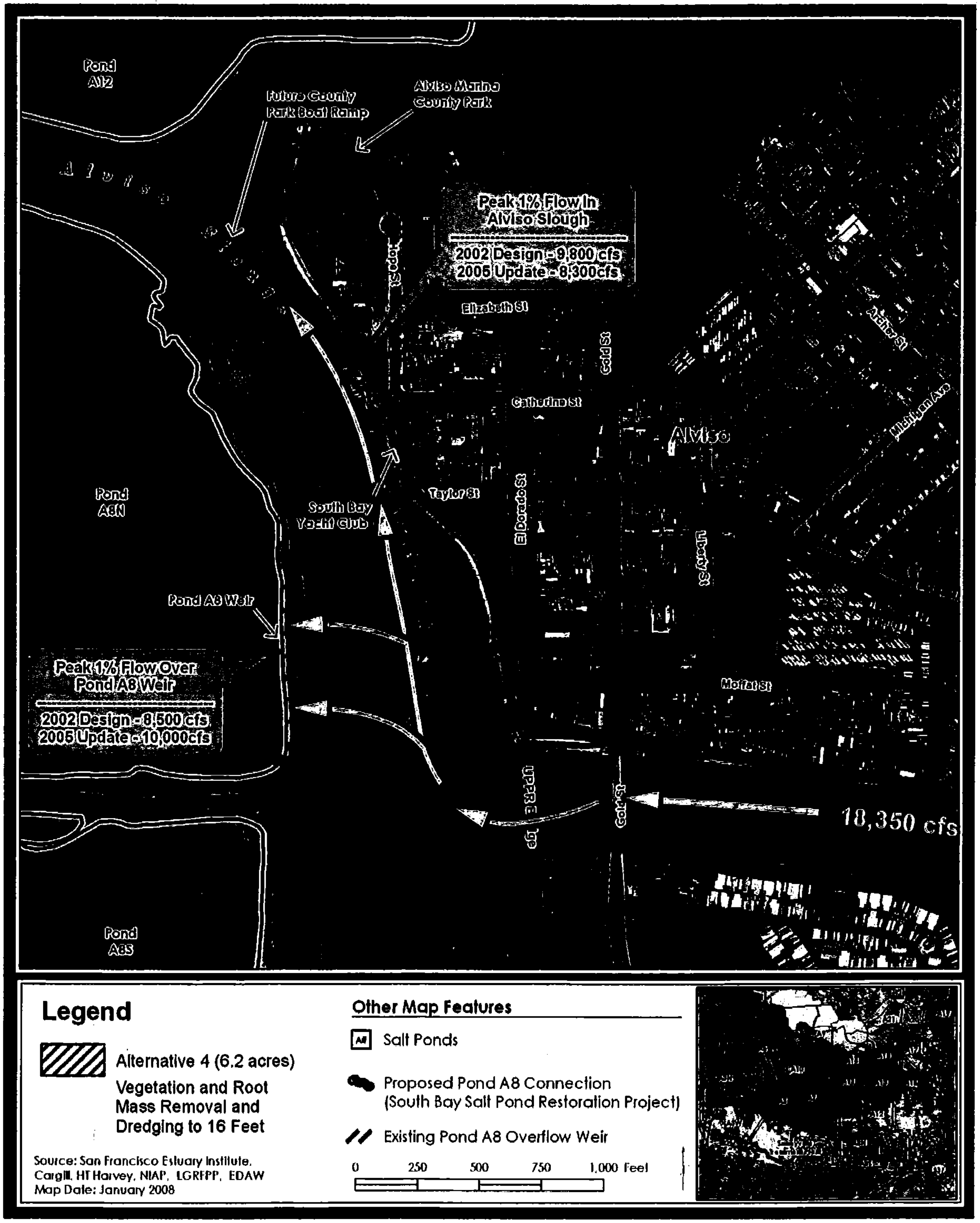
Source: San Francisco Estuary Institute, Cargill, HT Harvey, NIAP, LGRFPP, EDAW
Map Date: January 2008

Figure 6. Alternative 2



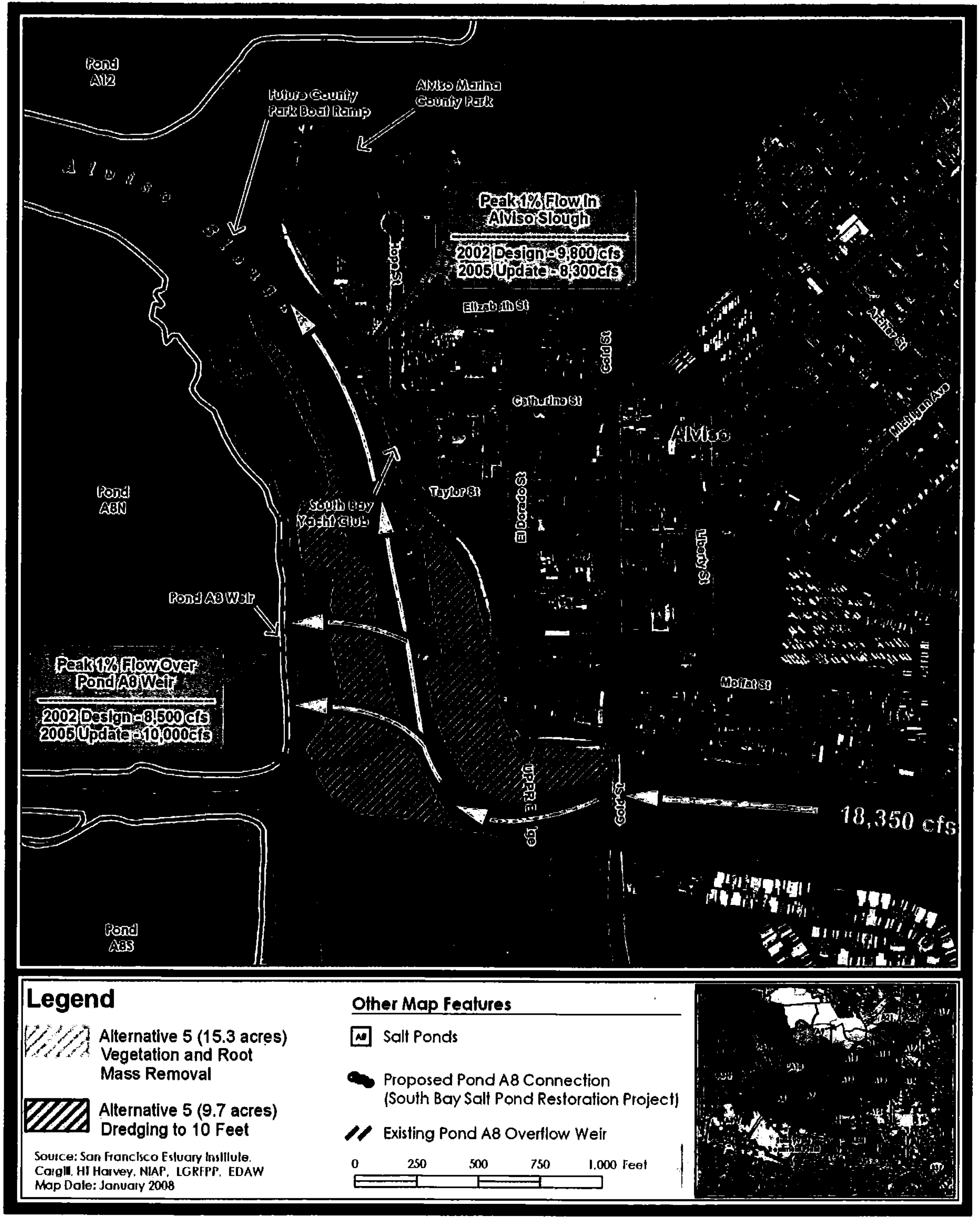
Source: San Francisco Estuary Institute, Cargill, HT Harvey, NIAP, LGRFPP, EDAW
Map Date: January 2008

Figure 7. Alternative 3



Source: San Francisco Estuary Institute, Cargill, HT Harvey, NIAP, LGRFPP, EDAW
Map Date: January 2008

Figure 8. Alternative 4



Source: San Francisco Estuary Institute, Cargill, HT Harvey, NIAP, LGRFPP, EDAW
Map Date: January 2008

Figure 9. Alternative 5

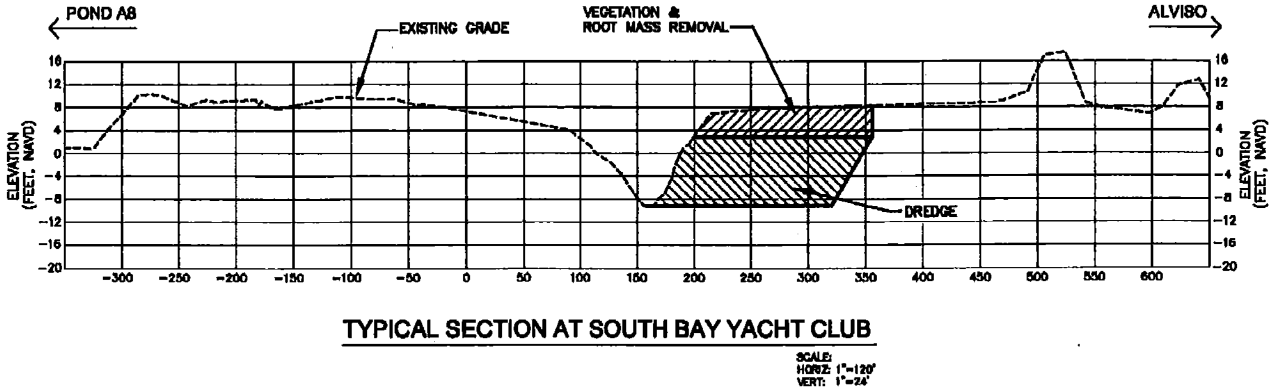


Figure 10. Conceptual Vegetation & Root Mass Removal and Dredge
Source: PWA